Code of Practice for Access and Working Scaffolds

HEALTH AND SAFETY AUTHORITY

National Authority for Occupational Safety and Health

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Foreword

The National Authority for Occupational Safety and Health (by virtue of Section 30 of the Safety, Health and Welfare Act, 1989, following consultation with the statutory Health and Safety Authority Advisory Committee on Construction Safety and with the consent of Mr Tom Kitt, TD, Minister of State at the Department of Enterprise, Trade and Employment, given on 11th December, 1998) has issued a Code of Practice entitled **"Code of Practice for Access and Working Scaffolds"**.

The Code of Practice provides practical guidance for persons who have specific duties in relation to the supply, design, construction and use of scaffolds, including suppliers, designers of scaffold structures, project supervisors for the design and construction stages, contractors and workers, in relation to the observance of their duties under Sections 6 to 12 of the Safety, Health and Welfare at Work Act, 1989 (No. 7 of 1989), Parts II, III, IV and XIII of the Safety, Health and Welfare at Work (Construction) Regulations, 1995 (S.I. No. 138 of 1995) and Parts II, IV, V and VIII of the Safety, Health and Welfare at Work (General Application) Regulations, 1993 (S.I. No. 44 of 1993).

The Code of Practice comes into effect on June 1st, 1999.

Notice of the issue of this Code of Practice was published in the "Iris Oifigiuil" of June 18th, 1999.

CD Body
Secretary to the Board

Acknowledgements

The text of this code of practice was drafted by an ad-hoc group reporting to the Advisory Committee on Construction Safety and was then subsequently accepted by the Advisory Committee on Construction Safety and approved by the Board of the Health and Safety Authority.

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1. Introduction

1.1. Background

This code of practice is the result of a joint initiative, which involved the Health and Safety Authority, the Construction Industry Federation and the Irish Congress of Trade Unions, to improve the standard of scaffolding. The code was drafted in consultation with the organisations that were represented on the Advisory Committee on Construction Safety. (See acknowledgements)

1.2. Status of Code of Practice

This code of practice is issued by the National Authority for Occupational Safety and Health under Section 30 of the Safety Health and Welfare at Work Act, 1989 and with the consent of the Minister for Labour, Trade and Consumer Affairs. The code is intended to provide practical guidance to scaffold erectors, contractors and users of scaffolding on the requirements and prohibitions set out in the relevant statutory instruments.

In particular, but not exclusively, the code provides guidance in relation to Part XIII of the Safety Health and Welfare at Work (Construction) Regulations, 1995, Working at Heights.

A failure to observe any part of this code will not of itself render a person liable to civil or criminal proceedings. Where the code of practice gives practical guidance on the observance of any of the relevant statutory provisions then compliance or non-compliance with those provisions of the code may be admissible in evidence in any criminal proceedings.

1.3. Scope of Code of Practice

This code applies to all places of work where scaffolds are used to provide working platforms, protection from falls or means of access during construction work.

The code of practice gives recommendations and practical guidance on the erection, use, inspection and dismantling of simple access and working scaffolds. It also gives recommendations and practical guidance on the training and instruction of those erecting, dismantling and using scaffolds.

The code deals mainly with system scaffolds as these are the most common scaffolds used in Ireland. It also contains outline guidance on the erection of basic tube and fitting scaffolds. The code does not give detailed recommendations or guidance on special scaffolds such as cantilever, truss-out or slung scaffolds.

BS 5973 *Code of Practice for Access and Working Scaffolds in Steel* gives comprehensive recommendations and guidance on the design, erection, use and dismantling of tube and fitting scaffolds and special scaffolds.

1.4. Scaffolding in Construction

Scaffolding performs several important functions during the construction process. It provides a temporary working platform to enable work to be performed at a height. It is also used to protect persons working at a height from falling or to protect persons working below from falling objects.

Falling from a height is the most common cause of accidental death and serious injury in the construction industry. Scaffolding which is adequately erected and maintained can prevent many such accidents.

1.5. Types of Scaffold

There are currently two main types of scaffolding in use in Ireland: system scaffolds and tube and fitting scaffolds

System scaffolding has become the most common type of scaffolding in use due to its ease of erection, use and reduced labour requirements. A system scaffold is a scaffold made of prefabricated elements and designed and manufactured in accordance with IS/HD 1000 or an equivalent standard. Each type of system scaffolding consists of a range of components such as standards, ledgers, transoms and base plates and has its own specific erection requirements.

Tube and fitting scaffolding is constructed from steel tubing and several types of couplers. Properly constructed, it forms a robust structure since the ledgers and standards are usually continuous across several bays or lifts.

1.6. Scaffolding Hazards

Poorly erected or maintained scaffolds can fail, sometimes catastrophically. Where a scaffold has inadequate foundations, tying or bracing or is overloaded, it can collapse, endangering workers and the public. Where scaffold boards or guard-rails are missing, workers can suffer severe injuries due to falls. Scaffolders will be at risk where a safe system of work is not in place to protect them from falls.

1.7. Risk Assessment

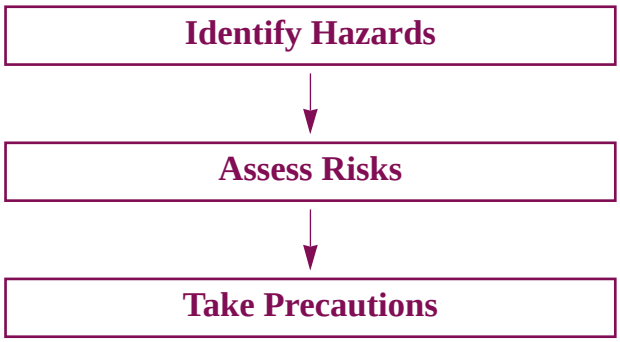

Figure 1: Risk Assessment

Project supervisors and contractors have legal obligations in relation to risk assessment. Each should seek to avoid risks, but where the risks can not be avoided a risk assessment should be performed.

The risk assessment should be based on the hazards in relation to the specific scaffold, e.g. adjacent overhead power lines, poor ground conditions or vulnerability to vehicle impact. It should assess how serious the risks are.

The risk assessment should take account of the nature of the work to be carried out, the loads and the height from which falls may occur.

Appropriate precautions should then be taken to control the risk and to prevent injury. These precautions should be detailed in the safety statement and/or the safety and health plan as appropriate.

The risk assessment of most scaffolding erection, use and dismantling will show that the level of risk is high unless there is a good standard of planning, design, equipment, training, supervision and checking to ensure safety.

1.8. Statutory Duties

A range of persons have specific duties in relation to the supply, design, construction and use of scaffolds. These duties are set out in the relevant statutory provisions, including in particular but not exclusively, the provisions listed below:

- Safety Health and Welfare at Work Act, 1989, Sections 6 to 12
- Safety Health and Welfare at Work (Construction) Regulations, 1995, Parts II, III, IV and XIII
- Safety Health and Welfare at Work (General Application) Regulations, 1993, Parts II, IV, V and VIII

The main duty holders include suppliers, designers of scaffold structures, project supervisors for the construction stage and contractors and workers.

1.8.1. Project Supervisor for the Design Stage

The duties of the project supervisor for the design stage's duties include:

- Co-ordinating the work of persons engaged in work related to the design of the project
- Taking account of the general principles of prevention.
- Preparing a preliminary safety and health plan where required

1.8.2. Designers

Designers of permanent structures and temporary scaffolds have duties which include:

- Taking account of the general principles of prevention
- Co-operating with the project supervisor for the design stage or the project supervisor for the construction stage
- Taking account of directions of the project supervisors
- Providing the project supervisor for the design stage or the project supervisor for the construction stage with information on particular risks.

1.8.3. Project Supervisor for the Construction Stage

The project supervisor for the construction stage has significant duties in relation to the safety of scaffolding. These duties include:

- Developing the preliminary safety and health plan
- Co-ordination of the implementation of the regulations
- The organising of co-operation between contractors and the co-ordination of their activities
- The co-ordination of arrangements for the checking of safe working procedures.

For example, the project supervisor for the construction stage should ensure that arrangements are in place to communicate the requirements of the scaffold users to the scaffold erectors.

1.8.4. Contractors

Contractors, including sub-contractors and specialist scaffolding contractors, have a very significant range of responsibilities under the relevant statutory provisions. These duties include the following:

- Every contractor using a scaffold should satisfy himself, before using the scaffold, that it is stable, that the materials are sound and that the safeguards required by the regulations are in place.
- A contractor may not use a scaffold unless it has been inspected before use and within the previous seven days and form CR 8 report of result of inspection of scaffolds has been completed.

Where a scaffolding contractor is engaged by another contractor to construct, maintain or dismantle a scaffold each contractor will assume a number of duties under the regulations. The agreement between contractors should clearly state which contractor is responsible for fulfilling specific duties. For example, the agreement should be clear as to which contractor is responsible for performing inspections of the scaffold.

1.8.5. Workers

Workers, including scaffold erectors, have responsibilities under the relevant statutory provisions which include:

- Taking care for their own safety and the safety of others
- Co-operating with their employer and taking account of training and instruction given by the employer
- Making full use of harnesses, helmets or other protective equipment provided.
- Reporting to his employer defects in the scaffold or in the system of work which may endanger health and safety
- Not interfering with or misusing the scaffold.

For example, scaffold erectors should ensure that, at the time of handing over of the scaffold to the contractor, the scaffold is fit for its intended purpose and it is in a safe and stable condition.

1.9. Illustrations

The illustrations used in this code show a type of system scaffold which is in common use in Ireland. The illustrations are intended to apply to simple access and working scaffolds in general. They do not supersede or replace the illustrations or arrangements contained in the system manufacturer's erection instructions. Such instructions should always be referred to.

1.10. Definitions

For the purposes of this Code of Practice, the following definitions apply (see figure 2 on page 6):

1.10.1. Types and Dimensions of Scaffolds

Base Lift: A lift erected near the ground
Bay: The space between the centre lines of two adjacent standards along the face of a scaffold
Bay Length: The distance between the centres of two adjacent standards, measured horizontally along the face of a scaffold
Height: The height measured from the foundation to the top assembly of ledgers and transoms (cf. *Lift Height*)
Length: The length of a scaffold between its extreme standards, sometimes designated by the number of bays (cf. *Bay Length*)
Lift: The assembly of ledgers and transoms forming each horizontal level of a scaffold
Lift Height: The vertical distance between two lifts, measured centre to centre
Scaffold: A temporarily provided structure which provides access, on or from which persons work or which is used to support materials, plant or equipment
Free Standing Scaffold: A scaffold which is not attached to any other structure and is stable against overturning on its own account or, if necessary, assisted by guys or rakers and anchors

Independent Tied Scaffold: A scaffold, which has two lines of standards, one line supporting the outside of the deck and one the inside. (see figure 2 on page 6). It is not free-standing being connected to the building.
Slung Scaffold: A scaffold hanging on tubes, ropes or chains from a structure overhead. It is not capable of being moved or lowered
Suspended Scaffold: A scaffold hanging on ropes which is capable of being suspended or raised or lowered
System Scaffold: a service and working scaffold made of prefabricated elements and designed and manufactured in accordance with IS/HD 1000 or an equivalent standard.
Width: The width of a scaffold measured at right angles to the ledgers from centre to centre of the uprights

1.10.2. Structural Members

Brace: A tube placed diagonally with respect to the vertical or horizontal members of a scaffold and fixed onto them to afford stability
Cross Brace: See *Ledger Brace*
Facade Brace: A brace parallel to the face of a building
Knee Brace: A brace across the corner of an opening in a scaffold to stiffen the angles or to stiffen the end support of a beam
Ledger Brace: A brace at right angles to the building in a vertical plane
Plan Brace: A brace in a horizontal plane
Transverse Brace: A brace generally in the plane of the shorter dimension of the scaffold
Bridle: A tube fixed across an opening or parallel to the face of a building to support the inner end of a transom or tie tube
Butting Tube: A tube, which butts up against the facade of a building or other surface to prevent the scaffold, moving towards that surface
Guard-Rail: A member incorporated in a scaffold to prevent the fall of a person from a platform or access way
End Guard-Rail: A guard-rail placed across the end of a scaffold or used to isolate an unboarded part
Ledger: A longitudinal tube normally fixed parallel to the face of a building in the direction of the larger dimensions of the scaffold
Raker: An inclined load-bearing tube
Reveal Tube; A tube fixed by means of a threaded fitting or by wedging between two opposite surfaces of a structure, e.g. between two window reveals, to form an anchor to which the scaffold may be tied
Standard: A vertical or near vertical tube
Tie or Tie Assembly: The components attached to an anchorage or the building or framed around a part of it or wedged or screwed into it with a tie tube. Used to secure the scaffold to the structure
Movable Tie: A tie, which may be temporarily moved for the execution of work
Non-Movable Tie: A tie, which will not be moved during the life of a scaffold, as agreed between the user and the scaffold erector
Reveal Tie: The assembly of a reveal tube with wedges or screwed fittings, and pads, if required, fixed between opposing faces of an opening in a wall together with the tie tube
Through Tie; A tie assembly through a window or other opening in a wall
Transom: A tube spanning across ledgers to form the support for boards or units forming the working platform or to connect the outer standards to the inner standards
Butting Transom; A transom extended inwards to butt the building to prevent the scaffolding moving towards the building
Sway Transom; A transom extended inwards in contact with a reveal or the side of a column to prevent the scaffold moving sideways

1.10.3. Scaffold Fittings

Base Plate: A metal plate with a spigot for distributing the load from a standard or raker or other load-bearing tube
Adjustable Base Plate: A metal base plate embodying a screw-jack
Coupler; A component used to fix scaffold tubes together
Check Coupler or Safety Coupler; A coupler added to a joint under load to give security to the coupler(s) carrying the load
Right Angle Coupler: A coupler used to join tubes at right angles
Sleeve Coupler: An external coupler used to join one tube to another coaxially
Supplementary Coupler: Coupler(s) added to a joint to back up the main coupler taking the load when the estimated load on the joint is in excess of the safe working load of the main coupler
Swivel Coupler; A coupler for joining tubes at an angle other than a right angle
Cantilever Bracket or Stage Bracket: A bracket usually attached to the inside of a scaffold to enable

boards to be placed between the scaffold and the building
Joint Pin: An expanding fitting placed in the bore of a tube to connect one tube to another coaxially (see *Spigot*)
Reveal Pin: A fitting used for tightening a reveal tube between two opposing surfaces
Sole Board: A timber, concrete or metal spreader used to distribute the load from a standard or base plate to the ground
Spigot: An internal fitting to join one tube to another coaxially (see *Joint Pin*)
Spigot Pin: A pin placed transversely through the spigot and the scaffold tube to prevent the two from coming apart

1.10.4. Other Terms in General Use

Anchorage: Component cast or fixed into the building for the purpose of attaching a tie
Brick Guard: a metal or other fender filling the gap between the guard-rail and the toe-board, and sometimes incorporating one or both of these components
Castor; A swivelling wheel secured to the base of a vertical member for the purpose of mobilising the scaffold
Kentledge: Dead weight, built-in or added to a structure to ensure adequate stability
Scaffold Board; A softwood board generally used with similar boards to provide access, working platforms and protective components such as toe-boards on a scaffold
Sheeting: Horizontal, vertical or inclined sheets of material, such as corrugated metal or plastic sheets or nets, attached to a scaffold in order to provide protection from the effects of weather or alternatively to protect the surrounding area from the effects of works being carried out from the scaffold structure
Toe-board: An up-stand at the edge of a platform, intended to prevent materials or operatives' feet from slipping off the platform
End Toe-board: A toe-board at the end of a scaffold or at the end of a boarded portion of it
Working Platform; The deck from which building operations are carried out

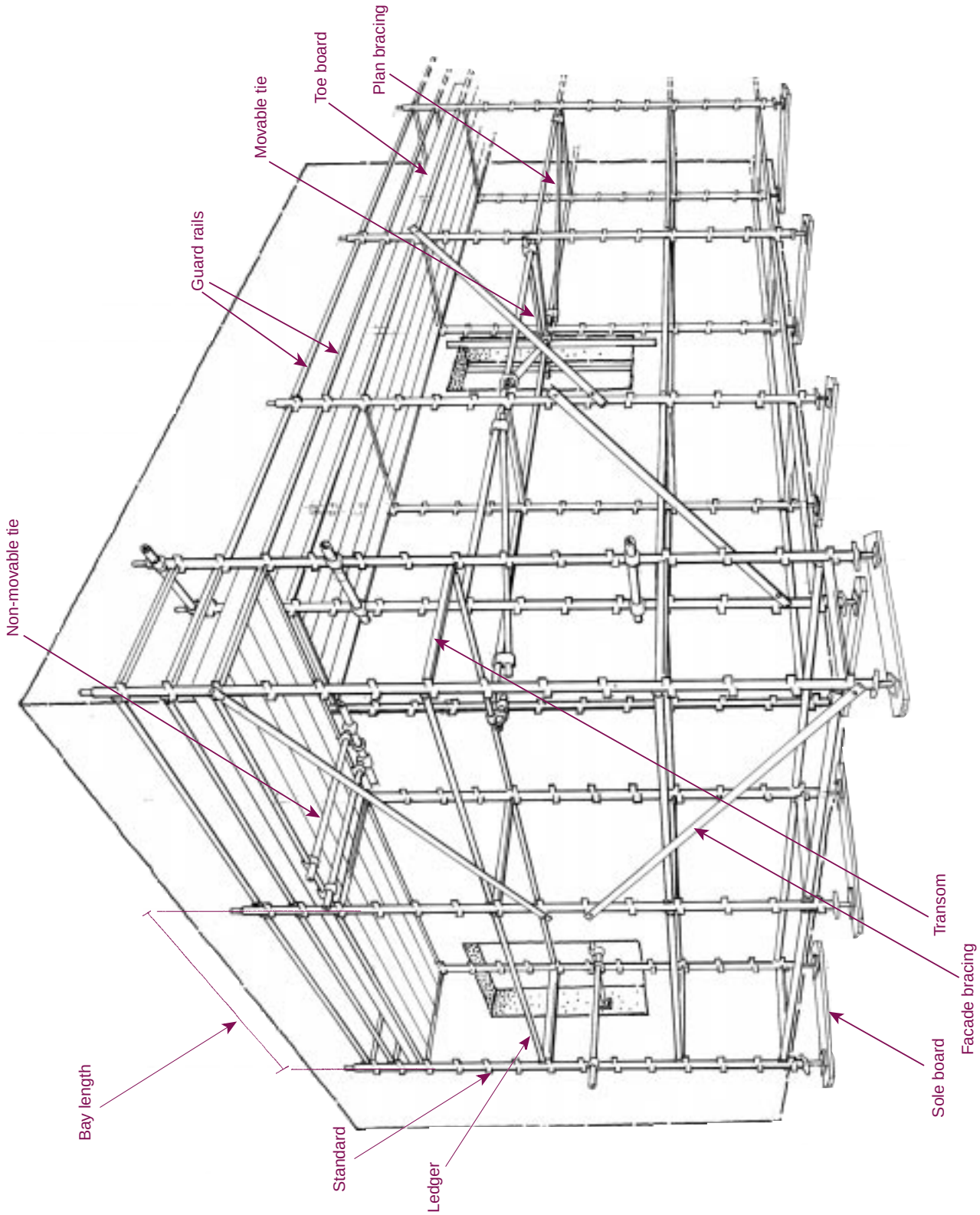

Figure 2. Example of an independent tied system scaffold

2. Management and Control of Scaffolding

2.1. Management of Scaffolding Activities

Maintaining scaffolding in a safe condition requires active management. The high rate of activity and change on construction sites, together with the high risk associated with scaffolding work requires a high level of safety management to prevent accidents and ill-health. The five steps listed below provide a practical template for the systematic management of scaffolding operations.

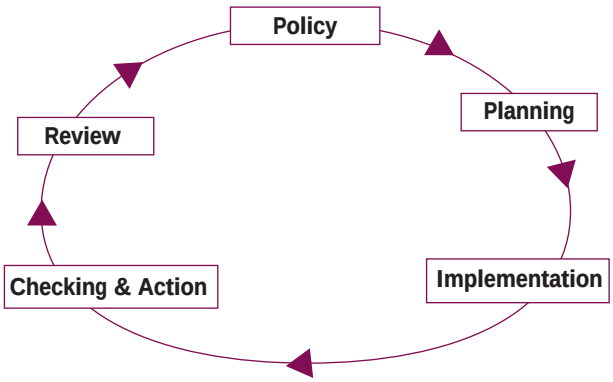

Figure 3: Scaffolding Management

Step 1 - Scaffolding Policy

The contractor should define a policy in relation to scaffolding. The policy should:

- Include a commitment to put measures in place to protect employees, others at work and members of the public from the risks associated with scaffolding
- Require that competent persons be employed to erect, maintain and dismantle scaffolds.
- Include a commitment to comply with relevant health and safety legislation, including the Safety Health and Welfare at Work (Construction) Regulations, 1995 and relevant Codes of Practice and guidelines
- Clearly place the management of scaffolding as a prime responsibility of site management
- Include a commitment to provide appropriate resources to implement the policy

Step 2 - Planning

The scaffolding erection, use and dismantling stages should be planned so as to minimise the risks involved. The planning process should address the areas listed below:

- **The relevant legal and other requirements should be identified**
  The major legal requirements applying are those contained in the Safety Health and Welfare at Work (Construction) Regulations, 1995 and the Safety Health and Welfare at Work Act, 1989. Where system scaffolds are used, the manufacturer's requirements should be identified.
- **The job should be defined**
  The ground preparation, layout, scheduling, loading, access, tying arrangements and other requirements of the particular job should all be defined.
- **Responsibilities should be assigned**
  Organisations or individuals with responsibility for performing specific tasks and duties relating to the control of scaffolding should be identified.
- **Hazards should be identified**
  A hazard is anything that can cause harm. Hazards should be systematically identified for each project.
- **Risks should be assessed**
  When assessing the risks associated with the identified hazards, account should be taken of both the likelihood of harm occurring and the severity of the resulting injuries. (See 1.7)
- **Risks should be eliminated or reduced**
  In reducing the risk the preferred solutions are collective controls, e.g. protective barriers that protect everybody from falling; less preferred are administrative controls which seek to reduce risk by adherence to instructions or procedures, and least preferred are solutions which rely solely on the use of personal protective equipment, e.g. harnesses or safety helmets or safety signs.
- **The identified hazards and the necessary precautions should be written down**
  These should be written in the safety statements or site specific amendments to the safety

statements and where a safety and health plan is required, incorporated into it.

- **Clear performance standards should be set**
  For example, that all edges above 2 metres in height will be protected by guard-rails and toe-boards.

Step 3 - Implementation

The plan is transformed into action in the implementation step. Successful implementation requires that the issues listed below are addressed:

- **Responsibilities**
  Individual responsibilities should be clearly communicated, persons should be given the authority and resources to carry out their responsibilities and individuals should be held accountable for their successes or failures in performing their duties.

- **Instruction, training and competence**
  The required instruction and training should be identified and persons performing the work should have the appropriate level of competence.

- **Communication**
  Relevant information relating to design, scheduling, loading, etc. or contained in safety statements or the safety and health plan should be communicated to those who need that information. For example, those performing periodic safety inspections need to know the maximum design imposed load and the design maximum tie spacing and those erecting the scaffold will need to have copies of the system scaffold erection instructions available.

- **Documentation**
  Appropriate documentation should be maintained on site. This will include safety statements, safety and health plans, inspection records including statutory CR8 “Scaffolds - Report of Inspection” forms, etc.

Step 4 - Checking and Corrective Action

Periodic checking is necessary to determine if performance standards are being met and to enable early corrective action to be taken. For example the scaffold should be inspected:

- Before it is taken into use
- Since any modifications, exposure to bad weather or periods without use
- At least every seven days

More frequent inspection will be required where there is evidence of recurring deficiencies, unauthorised modification or other circumstances, which might affect the strength and stability of the scaffold.

Where defects are found they should be rectified and the root causes of serious or recurring defects should be identified and corrective action taken to prevent a recurrence

Step 5 - Reviewing the Work

This step helps to make each job a learning experience so that the next job can be done more effectively. The following questions should be asked:

- Was the planning adequate or were there unwelcome surprises?
- Was the implementation adequate so that the job was completed as planned?
- Were the planned checks carried out and did the necessary corrective action take place?
- What changes will be necessary for the next job?

2.2. Choice of Scaffolding Equipment

Scaffolding equipment should be selected on the basis of a risk assessment, which takes account of the nature of the work to be performed, the loads to be withstood and the height from which falls may occur

2.3. Layout and Design

A well laid-out scaffold will require the minimum amount of modification during its life and will be capable of being erected, used and dismantled in safety.

2.3.1. Layout

The initial layout will have a significant impact upon the safety of the completed scaffold. When considering the layout the points listed below should be considered:

- The scaffold should be laid out so as to reduce the gap between the structure and the scaffold

to a minimum, except where guard-rails will be erected adjacent to the structure.

- The standards should be positioned so as to avoid manhole lids or shallow drains which may not be able to sustain the scaffold loading.

2.3.2. Structural Design of Scaffolds

System scaffolds, designed and manufactured in accordance with IS/HD 1000 or an equivalent standard, may be constructed without further calculations provided they are constructed in accordance with the system scaffolding manufacturer's instructions and restrictions.

Basic simple unsheeted tube and fitting scaffolds may be constructed to a height of 50 metres without calculations provided they are constructed in accordance with Sections 2 and 3 of this code and do not carry greater loads nor have greater bay lengths than those given in *Table 4: Maximum Bay Centres for Tube and Fitting Scaffolding* in Appendix A: Tube and Fitting Scaffolds on page 36.

A further recommendation is that scaffold working platforms are not subjected to loading of materials by mechanical means, e.g. by rough terrain fork lift trucks.

All other forms of scaffold, including special scaffolds, should be subject to design and calculation by a competent person such as a chartered structural engineer with appropriate experience or by another competent person.

Section 5 of BS 5973; 1993 gives guidance on special scaffolds which are subject to calculation and Section 6 and Appendix B of BS 5973; 1993 give technical data and examples of calculations.

For illustrative purposes, typical examples where design and calculation may be necessary include:

- Sheeted system scaffolds
- System scaffolds erected in areas where the wind pressure exceeds that specified in IS/HD 1000 or where the design wind speed exceeds that specified by the scaffolding manufacturer
- System scaffolds where the maximum height, tie spacing, imposed loads, bay widths or number of working lifts exceeds the manufacturer's recommendations
- Scaffolds where the tie or anchorage capacity is less than 6.25 kN (637 kg)
- Tube and fitting scaffolds where the maximum tie spacing exceeds that of *Table 5: Frequency of ties in square metres per tie for tube and fitting scaffolds* in Appendix A on page 35.
- Tube and fitting scaffolds where the height exceeds 50 metres for unsheeted scaffolds and 25 metres for sheeted scaffolds
- Scaffolds with temporary roofs
- Scaffolds subjected to impact e.g. mechanical loading of heavy materials onto working platforms.
- Scaffolds where the bottom transoms or ledgers have been omitted to allow pedestrian access
- Scaffolds where the first line of ties is more than 4 metres above the base of the scaffold
- Scaffold buttresses
- Special scaffolds including: loading bays, protection fans, nets, pavement frames, cantilever scaffolds, truss-out scaffolds, free standing external towers, hoist towers, slung scaffolds, pedestrian bridges and walkways, temporary ramps and elevated roadways, masts, lifting gantries, temporary buildings and roofs.
- Scaffolds where the required bracing is omitted
- Scaffolds where the allowable bearing pressure of the ground may not be adequate to support the scaffold

2.3.3. Building Design and Scaffold Erection

The design of the temporary works can be affected by, or can affect, the design of the permanent works. For example, many system scaffolds require that every standard be tied to the structure under construction or to some other substantial structure. The best arrangement is where the ties can be left in place until final dismantling of the scaffold.

The project supervisor construction stage should, at an early stage, seek the co-operation of building designers in permitting the attachment of non-movable ties to the building structure where such attachment is reasonably practicable.

Timely provision of adequate details of the proposed permanent works is necessary in order to properly schedule the construction of the temporary works and Project Supervisors should co-ordinate these matters.

For example, project supervisors should ensure that information on the proposed location of adjacent drains or other excavations is available to the temporary works designer or contractor so that they

can ensure that the foundations of the relevant scaffolds are not undermined. Where such information is not received in a timely manner, the project supervisors should ensure that adequate time is allowed for the safe completion of the project.

2.4. Erection Scheduling

Proper scheduling of activities is necessary in order to ensure that the scaffold is available and safe to use when it is needed and to ensure that the activities of an individual trade do not endanger the scaffold or the users of the scaffold. The scheduling issues listed below should be considered.

- Where scaffolds are providing edge protection e.g. during form-work erection or block laying at the edges of concrete floor slabs, the platform should be maintained as close as practicable to the working level and in no case more than 2.0 metres below the working level.
- Where movable ties are provided, replacement ties should be installed before existing ties are removed to facilitate plasterers, glaziers or other trades.
- The particular needs of scaffold users or specific trades should be determined in advance so that adequate scaffolding provision can be made before they commence working.
- Adjacent excavations, which could undermine the scaffold foundation, should be back-filled before scaffold erection or the excavations should be deferred until after the scaffold has been dismantled.

2.5. Planning for Use and Maintenance

A scaffold rarely stays the same between initial erection and final dismantling. There is therefore a need to plan how the scaffold will be modified, inspected and maintained. The issues listed below should be considered when planning for use and maintenance:

- The particular needs of different trades working on the scaffold imposed loads, scheduling (painters, plasterers and brick layers work at significantly different rates), cantilever brackets, adjustments to ties and guard-rails etc., should be identified and provision made to meet these needs before the work is planned to start.
- A competent person with responsibility for modifying, inspecting and maintaining the scaffold should be appointed.
- An adequate number of competent scaffolders should be maintained on site to allow modifications to be made in good time. This will usually require the full-time attendance of at least one competent scaffolder on sites where modifications are likely to be frequent.
- The restrictions on imposed loads and unauthorised modifications to the scaffold should be communicated to users. The contact person for complaints or requests for scaffolding modifications should be identified. This should be done as part of the normal health and safety induction, which everybody on site should receive.

2.6. Information to Purchasers of Scaffolding Equipment

The manufacturers and suppliers of system scaffolds and components have a duty to supply information to the purchaser. Those supplying system scaffolds and components for hire or lease also have a duty to supply information to the hirer or lessee.

The information should include the use for which the scaffold has been designed or tested, and any information necessary to ensure that the scaffolding may be erected, dismantled and used safely. The supplier should provide a complete set of instructions that are sufficient to ensure the safe erection, use and dismantling of the scaffold.

2.7. Information to Users of Scaffolding Equipment

Workers should receive sufficient information and, if appropriate, written information on the scaffold equipment. This should include safety and health information on:

- Conditions for use of the equipment, including instructions for its safe use and, where appropriate, assembly and dismantling plans.

- Any unusual conditions which can be foreseen
- Any conclusions to be drawn from experience of using the type of scaffold equipment

The information provided should be comprehensible to the workers concerned.

3. Erection of Scaffolds

3.1. Safe Erection and Dismantling

Scaffolding should be erected and dismantled so that the risks to the scaffolders, other workers and the public are eliminated or minimised.

3.1.1. Safety of Scaffolders

The major life threatening hazards facing scaffolders are the risk of falls from a height, falling scaffold components and the risk of contact with overhead electric lines.

The scaffolding contractor should carry out a risk assessment relating to the type of scaffolding operations to be carried out at the site. The safety statement of the scaffold erection contractor and, where appropriate, the site safety and health plan should identify the hazards that erecting a scaffold on the site is likely to present and specify the necessary precautions.

The Safety Health and Welfare at Work (Construction) Regulations, 1995 require persons at work to be protected from the danger of falling, either by the provision and use of collective safeguards such as adequate working platforms and guard-rails or, where this is not practicable, by the provision and use of safety nets or personal protective equipment, such as suitable safety harnesses and anchorages.

Collective safeguards should be specified in the safety statement and/or safety and health plan. These will normally include, as far as is possible, the use of ladders or stairs and the placing of decking and guard-rails on each platform before scaffolders go onto it or else as soon as practicable. Where scaffolders will be working on a standard width scaffold for only a very short time, they may work off a three board wide platform provided that guard-rails are installed immediately following the installation of the boards.

Where the necessary collective safeguards will be inadequate during certain phases of the work, personal protective equipment, for example, nets harnesses and safety lines, should be used to supplement the collective safeguards.

Construction of certain scaffold types or construction which includes certain activities may present difficulties in providing collective safeguards throughout all phases of the work. Such work will normally require the supplementary use of personal protective equipment, including the fixing of anchorages, until collective safeguards become adequate. Examples of such work include:

- Cantilever loading bays
- Cantilever scaffolds
- Truss out scaffolds
- Slung scaffolds
- Protection fans and nets
- Bridges and walkways
- Work on temporary buildings and roofs
- Fragile roof work
- Work over or near water
- Work in confined spaces, such as sewers, deep excavations, lift wells and shafts, deep basements or sumps, where rescue may be required
- Work out of man baskets or cradles

Where personal protective equipment is to be used the contractor should specify in the safety statement and the project supervisor should incorporate into the safety and health plan, the means of personal protection, how it is to be used, and the means of attachment and the rescue procedures. The contractor should provide adequate training, instruction and supervision to ensure that the personal protective equipment is used properly at all relevant times.

3.1.2. Safety of Other Workers and Persons

Other workers or members of the public may be placed at risk during the erection of scaffolding. Adequate precautions should be taken to eliminate or reduce the risk and these should include:

- Other workers and the public should be effectively excluded from the work areas by signs and/or barriers.

- Where persons can not be excluded from the working area they should be protected by the provision of properly constructed sheeting or fans.

3.1.3. Incomplete Scaffolding

A scaffold should be constructed so that it is left complete and is properly tied, braced and decked and has adequate guard-rails and toe boards. Where a scaffold is left incomplete there is a danger that it will be used to gain access while it is in a dangerous condition.

Where a scaffold is partly erected or dismantled, a prominent warning notice should be placed at each potential access point and barriers should be placed to prevent access. Such notices should be removed when they are no longer required.

The most effective way of preventing access to an incomplete scaffold is by removing all decking and ladders. Incomplete scaffolds should be completed or dismantled as soon as practicable.

3.2. Materials

3.2.1. Inspection Prior to Use

All materials should be inspected before use. The inspection should be performed before despatch to the site or upon arrival at the site. An area should be set aside for damaged or defective material. Signs should be erected indicating that the material is defective and is not to be used. A check-list is provided in Appendix B on page 39 to assist this examination.

3.2.2. Standards

Standards are the vertical tubular members that transmit the vertical loads of the scaffold to the foundations. The spacing of system scaffolding standards should follow the recommendations in the manufacturer's erection instructions.

For tube and fitting scaffolds, the spacing between standards given in *Table 4: Maximum Bay Centres for Tube and Fitting Scaffolding* on page 36 should not be exceeded.

3.2.3. Transoms

Transoms run at right angles to the structure, joining the inside and outside ledgers and supporting the scaffold boards. Intermediate transoms may be required to support the scaffold platform between main transoms.

The lowest transom should be installed as close as possible to the bottom of the standards, otherwise, the load carrying capacity of the scaffold will be significantly reduced. The bottom transom is sometimes omitted to permit pedestrians to walk through the scaffold. The risk assessment and safety and health plan may indicate other solutions such as erection of a protected hoarding outside the scaffold, which do not compromise the strength of the scaffold.

3.2.4. Ledgers

Ledgers run along the inside and outside of the scaffold joining each pair of standards to another pair. They also support any intermediate transoms. The load carrying capacity of the scaffold will be significantly reduced where it is not possible to place the first ledger at the base of the standards. (See 3.2.3.) Tube and fitting ledgers should be joined with sleeve couplings or with expanding joint pins where tension is not likely to occur.

3.2.5. Couplers

Couplers are used in conjunction with system scaffolds mainly for the attachment of ties, plan bracing and cross (ledger) bracing. The proper use of appropriate couplers is therefore important to the stability of the scaffold. Couplers, when new, should comply with the requirements of the relevant European or British Standard. Fittings for which there is no standard should only be used in accordance with the recommendations and data provided by the manufacturer or supplier.

The safe working loads, listed below, apply to couplers marked with EN 74 and where appropriate 'A' or 'B'.

Table 1: Safe Working Loads for Couplers

Type of Fitting	Class of Fitting	Type of Load	Safe Working Load
Right Angle Coupler	A	Slip along tube	6.3kN (643kg)
Right Angle Coupler	B	Slip along tube	9.4kN (959kg)
Swivel Coupler	A	Slip along tube	5.3kN (540kg)

From Table 17, BS 5973: 1993

3.3. Stability

A scaffold is a temporary structure that is subjected to a wide range of loading during erection, use and dismantling. It should support its own dead load

and live loads from construction materials, workers and tools, shock loads from material placement and wind loads.

Where failures occur, large areas of scaffolding can collapse quite suddenly. Scaffolds can collapse because of poor construction or misuse, leading to them being loaded beyond their safe capacity to support the load. Common faults are poor foundations, inadequate tying and bracing, overloading and the removal of ties and bracing.

Scaffold stability depends on carefully following the system scaffold manufacturer's instructions and the provisions of this code or other equivalent standards. In particular, the issues, listed below, should be addressed:

- The foundations should be adequate (See 3.3.1)
- The scaffold should be tied to the permanent structure or to buttresses (See 3.3.2)
- The scaffold should be braced (See 3.3.4)
- The scaffold should not be overloaded (See 3.8)

3.3.1. Foundations

The foundations of a scaffold should be adequate to support the load imposed by each standard and the scaffold as a whole throughout the life of the scaffold.

3.3.1.1. Ground Surfaces

- **Concrete and Steel Surfaces**
  Metal base plates should be used on concrete or steel surfaces of adequate bearing capacity.

- **Other Surfaces**
  Metal base plates should be used where the surface is a hard asphalt or similar surface with sufficient bearing capacity. Where the bearing surface is soil, compacted gravel, tarmacadam, hardcore paving slabs or a similar surface, sole boards of timber or another suitable material should be used. Where the surface has been disturbed or back filled or is soft it should be compacted.

Guidance on allowable bearing pressures for various soils and fills is given in BS 5975.

3.3.1.2. Sole Boards

Timber sole boards under any one standard should be at least 35 mm thick and at least 220 mm wide and 1000 cm^2 in area (e.g. 220 wide by 500 long). Where practicable, sole boards should support two standards. Larger sole boards should be used where the ground is soft. Previously used sole boards should never be used as scaffold boards, they should be marked so that they are readily distinguishable, e.g. the ends should be cut at an angle.

3.3.1.3. Base Plates

Base plates should be placed on the centre of sole boards and not less than 150 mm from either end. Adjustable base plates incorporate screw jacks to allow the scaffold to be easily levelled: they should not be extended beyond the manufacturer's recommendations.

3.3.1.4. Sloping Foundations

Many scaffolds are erected on sloping surfaces, e.g. footpaths and roadways. Using normal base jacks on such surfaces may induce bending in the bottom standards and reduce the loading capacity of the scaffold. Base plates which permit adequate rotation should be used or other measures should be taken to ensure that the capacity of the standards is adequate to sustain the design loads.

Special precautions may be necessary to ensure the stability of the scaffold where the ground slope exceeds 1 vertical to 10 horizontal.

3.3.1.5. Adjacent Excavations and Underground Services

Scaffolds should not be erected close to the edge of open excavations, and excavations should not be made close to the scaffold standards unless adequate arrangements have been made to support the standards. Scaffold standards should not be erected over shallow drains or manhole covers unless adequate arrangements have been made to carry the load over them.

Where excavations will affect only one standard, the load may be transferred to adjacent standards by using proprietary beams or A-frames. The adjoining standards should not be overloaded.

3.3.1.6. Blocks, Bricks and Other Material

Loose blocks or bricks or similar materials should not be used to support scaffold standards as they may split, slip out or fall over. Adjustable base plates should be used instead of such materials.

3.3.2. Ties

General

Ties connect the scaffold to the structure being built. Ties perform a dual function.

- They stabilise the entire scaffold to prevent it from falling toward or away from the building
- They stabilise the individual scaffold standards to prevent them from buckling. As the loading on a scaffold increases, more ties may be needed to prevent the standards from buckling.

There are a number of different tie types. Those types of tie which are non-movable should be chosen, where reasonably practicable, as they present fewer difficulties with maintenance or interference. Non-movable ties are assumed to be cast or drilled into the structure and will not need to be moved until final dismantling of the scaffold.

Ties should resist movement toward the building and away from the building. Where a tie cannot resist movement toward the building, e.g.. through ties, long bolts and wire ties, the tie should be supplemented by other measures, e.g. by tubes butted against the building.

Ties should be securely coupled to both standards or to both ledgers, and as near to a node point as possible. Where ties are attached to the ledgers, they should be attached not more than 300mm from a standard. Where this hinders access along a working platform, attachment to the inside ledger or standard only is permissible.

System scaffold manufacturers may have different requirements relating to the maximum distance of ties from standards and node points. Where it is not possible to meet these distances, the manufacturer may permit plan- bracing to be installed between the tie and the standards.

Scaffolds of normal width of 1.25 metres should not be erected more than 4 metres higher than the highest line of ties, unless the scaffold has been cross braced between ledgers (ledger bracing) and the ties and scaffold are capable of taking the extra loads.

3.3.2.1. Cast-in and Drilled Anchorages

These anchorages, which are cast or drilled into the permanent structure, can usually be left in place until the scaffold is being dismantled. They are not subject to the degree of interference associated with other types such as through ties. These anchorages and their components should have a safe working capacity of at least 6.25 kN (637 kg) in both tension and compression.

Workers installing anchorages should be instructed in the manufacturer’s recommendations for each type of anchorage and these recommendations should be strictly complied with.

The anchorage capacity should be established by either a proof load test or by testing to failure a representative sample of anchorages. The manufacturer’s recommendations in relation to the safe working capacity and testing should be followed.

Most cavity walls, cladding panels and many parapets and other architectural features will be unsuitable for the attachment of anchorages. Where refurbishment work is being undertaken, the capacity of the building fabric to withstand the anchorage loads should be assessed.

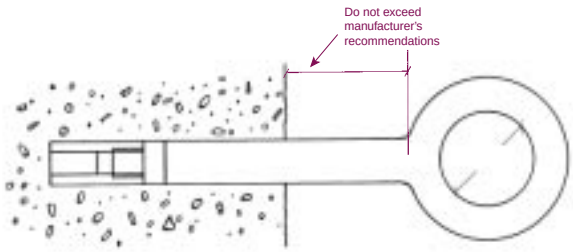

Figure 4. Typical ring bolt anchorage

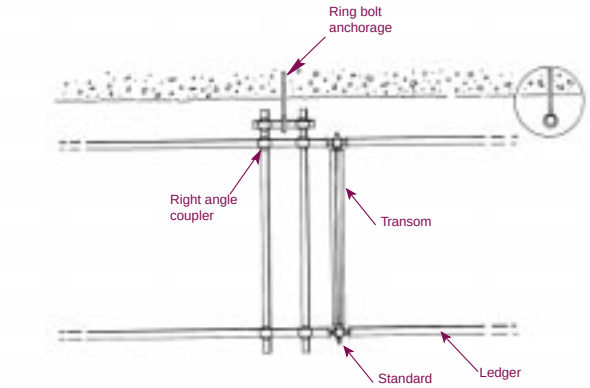

Figure 5. Example of ring bolt anchorage and tie

A ring bolt may be used by passing a scaffold tube through the ring and connecting it to the scaffold.

The exposed length of ring-bolt shank or other bolts should be kept short and it should not be extended beyond what is permitted in the manufacturer's written recommendations for bolts in compression. Where no written recommendations are available, the capacity of the tie in compression should be established by testing.

3.3.2.2. Through-Ties

Through-ties are attached to a tube across the inside and outside of an opening such as a window. It is preferred that this tube be vertical to prevent slipping and damage caused by workers standing on the tube and that the tie tube rest on or just above the lintel and close to the nearest standard. Other arrangements may be used where this is not practical. The inside tube should be supplemented by an outside tube or by a butting tube.

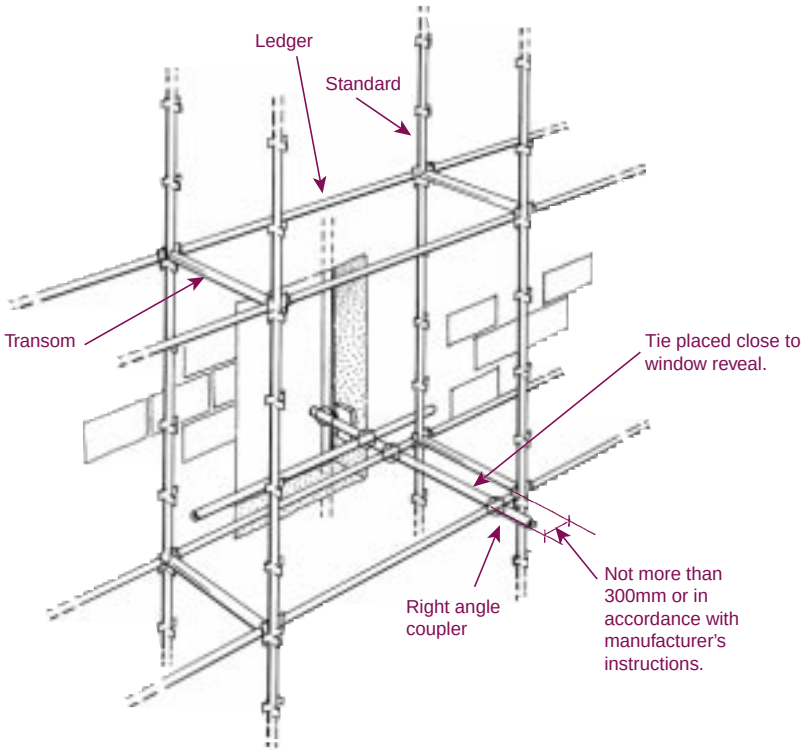

Figure 6. Through tie for tied scaffolds

3.3.2.3. Reveal Ties

Reveal ties may be used where it is impracticable to bolt into the fabric of the building or through open windows. These ties rely on friction and consequently require frequent inspection to ensure that the friction is maintained. Timber packing should be used, of approximately 10mm thickness (to minimise shrinkage). The end plates of the tube should be expanded onto the reveals by tightening a nut on the reveal pin. The tie tube should be fixed to the reveal tube not more than 150 mm from the reveal and at the opposite end from the reveal pin.

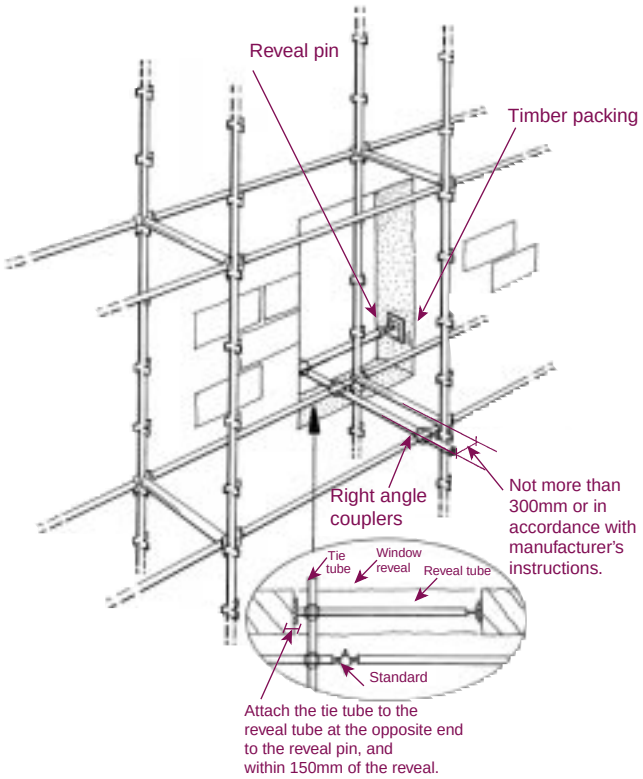

Figure 7. Reveal tie for tied scaffolds

Where reveal ties are used a greater number of ties are required (see *Table 5: Frequency of ties in square metres per tie for tube and fitting scaffolds* in Appendix A on page 37). Where practicable, no more than 50% reveal ties should be used unless they are supplemented by permanent bolted or cast-in anchorages and a high level of maintenance.

3.3.2.4. Returns

Where a system scaffold is returned, around the corner of building facades, it provides tying to the standards directly connected to the return. Plan bracing of ledgers would be required to provide tying to adjacent standards. Returns of tube and fitting scaffolds can be regarded as providing attachment of the scaffold to the facade for a 3 metre length measured from the end of the building.

3.3.2.5. Structurally Designed Buttresses

Structurally designed buttresses provide tying to those system scaffolding standards directly connected to the buttresses. Plan bracing is required to provide tying to adjacent system standards. Buttresses connected to tube and fitting scaffolding may be regarded as providing attachment of the scaffold to the facade for a 3 metre length measured from each side of the buttress.

3.3.2.6. Single Unjointed Raking Tubes

Single unjointed raking tubes coupled to the scaffold at 6 metre intervals and tied back to the scaffold at the foot may be considered as providing adequate stability in the direction toward the raker for scaffolds up to 6 metres high. The tube should be at an angle of not more than 2 vertical to 1 horizontal and not more than 6m in length. Plan bracing is required to provide tying to adjacent system standards between the rakers.

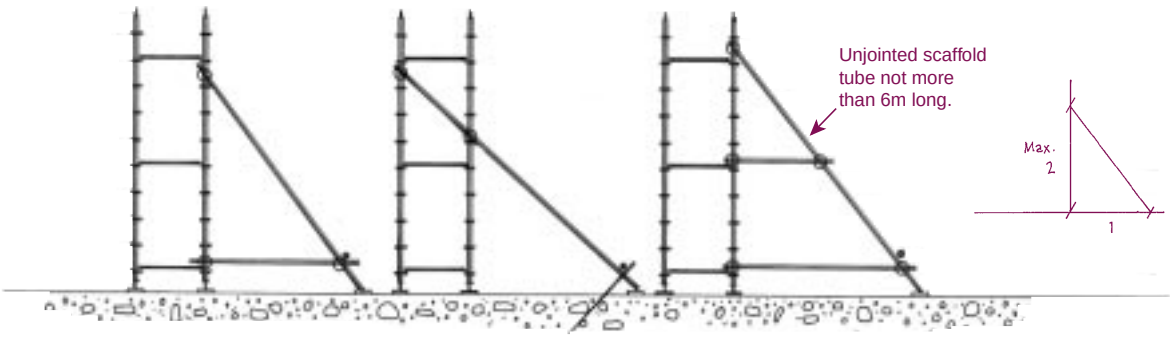

Figure 8. Stabilising a scaffold less than 6m. high – Raking Tubes

3.3.3. Tie Spacing

The spacing of ties is determined mainly by the loading and layout of the scaffold. As the loading, height, number of working platforms or number of boarded platforms or the wind loading increases then so does the number of ties required. The system manufacturer's instructions for tie spacing should be followed and for tube and fitting scaffolds the spacing given in *Table 5: Frequency of ties in square metres per tie for tube and fitting scaffolds* on page 37, should be followed.

3.3.3.1. System Scaffold Ties

Each type of system scaffold has a characteristic tying pattern recommended by the manufacturer. These patterns should be followed unless structural design calculations show any proposed variations to be safe. The system scaffolding manufacturer's recommended tying arrangements should be available to the scaffolders. The recommended tying arrangements should also be provided to the persons responsible for inspecting the scaffold during use.

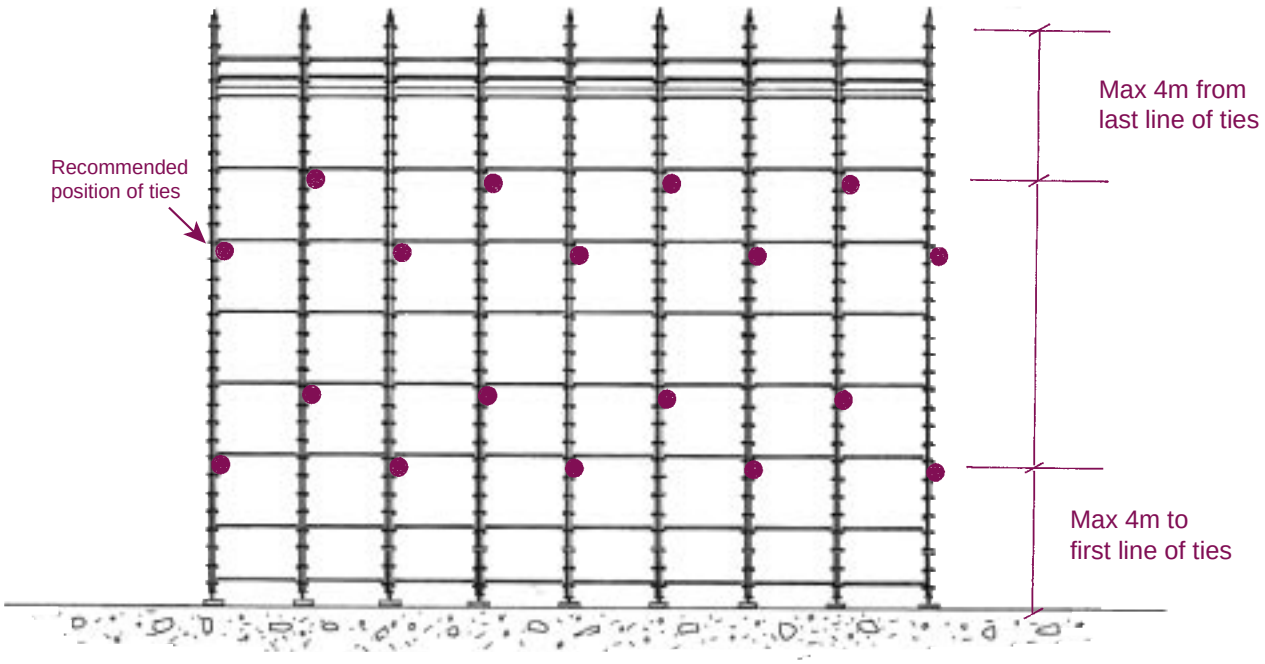

Figure 9. Example of a tie pattern for a lightly loaded scaffold

Many system scaffolds require every standard to be tied and for the first level of ties to be no more than 4 metres above the base plate. Where this is required but is not possible for an individual standard then the manufacturer may permit plan or cross bracing to be provided between ties to provide stability to the untied standard. Such bracing will transfer more load to the existing ties, these ties should be able to resist the increased loading and at least two couplers should provide restraint in each direction at both the scaffold and the wall end of the tie.

3.3.3.2. Tube and Fitting Scaffold Ties

The number of ties recommended in Table 5: *Frequency of ties in square metres per tie for tube and fitting scaffolds* on page 37, should, as a minimum, be installed. When tying sheeted scaffolds in accordance with Table 5 ensure that the coupler capacity is adequate and ensure that there are at least two couplers providing restraint in each direction at both the scaffold and the wall end of the tie.

The frequencies in Table 5 do not apply where the design wind speed is greater than 39 m/s (140 km/h)

3.3.4. Bracing

Bracing is required to stiffen the scaffold and prevent it from swaying. Swaying can cause instability, cracking of welds, and it can over stress the standards. Each plane of the scaffold should be braced by installing diagonal tubes that divide it into a complete series of triangles from the bottom to the top of the scaffold. The braces should be fixed as close as possible to the standard-ledger intersections. Couplers should be capable of sustaining a load of 5 kN (510 kg).

3.3.4.1. Facade Bracing

Facade bracing runs parallel to the building and examples of façade bracing include:

(a) A series of parallel diagonal tubes placed one above the other

(b) In long facades, a continuous diagonal tube from bottom to top

(c) A zigzag pattern

System scaffolding should be braced in accordance with the manufacturer's recommendations. The recommended facade brace spacing for some system scaffolds ranges from a maximum of 3 unbraced bays to a maximum of 8 unbraced bays, depending on the system.

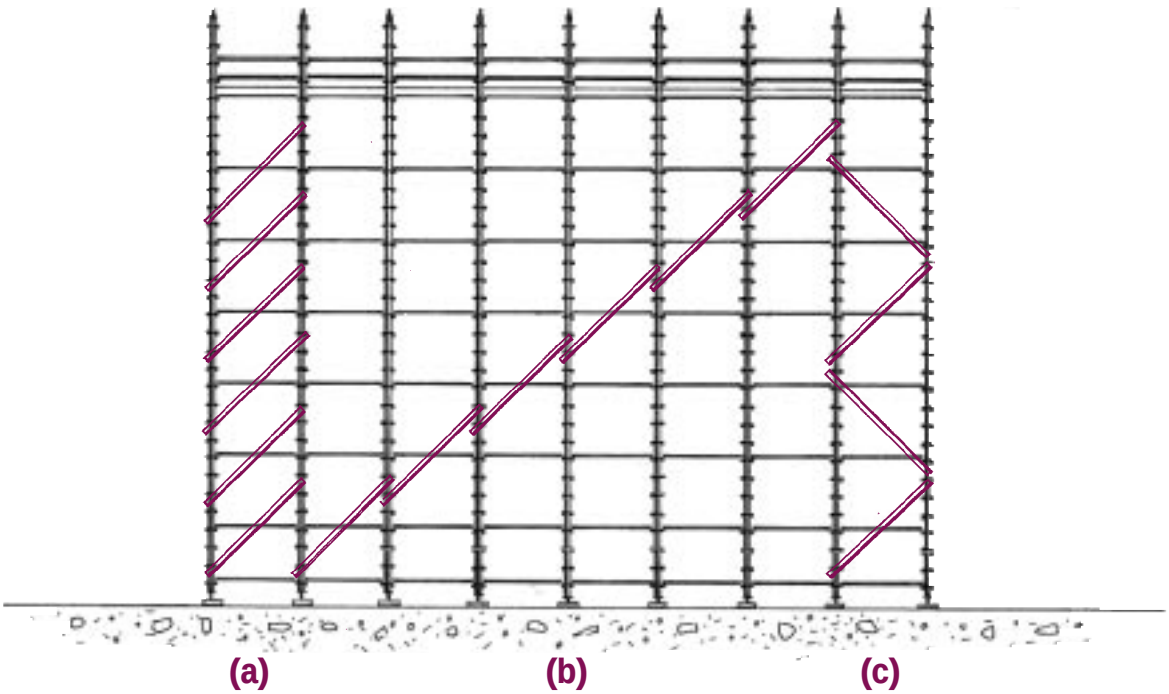

Figure 10. Examples of facade bracing

Tube and fitting scaffolds should braced at least every 30 metres, unless movement along the building is prevented by other means.

Bracing should be fixed as near to the standards-ledger intersections as possible. The bracing should extend to the bottom of the scaffold with no breaks.

3.3.4.2. Cross Bracing (Also known as Ledger Bracing)

- Cross bracing runs at right angles to the facade and is in a vertical plane.

Some types of system scaffolds do not require cross bracing unless:

- Ties cannot be located as required by the manufacturer or are liable to be removed, or
- The height of the scaffold is greater than 4 metres above the last line of ties.

Where cross bracing is installed for the above reasons, the loads on the adjacent ties will be increased. The system manufacturer's instructions should be consulted to determine whether cross bracing is required.

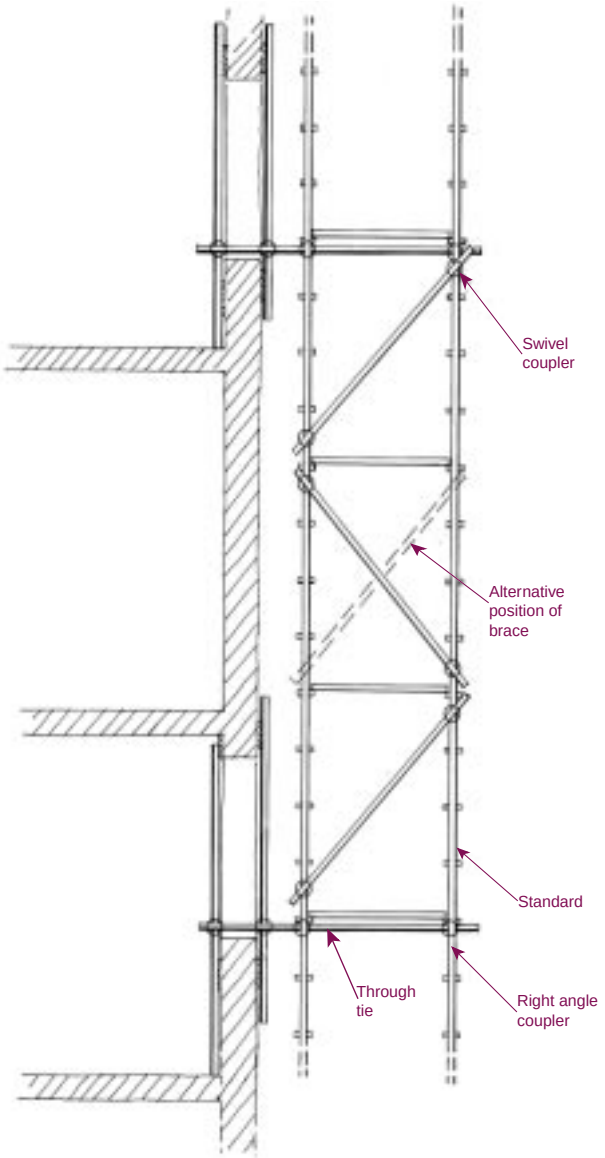

Figure 11. Example of cross bracing

Cross bracing should be installed on tube and fitting scaffolds. Brace alternate pairs of tube and fitting standards, ensuring that the bracing forms a complete series of triangles from bottom to top of the scaffold. Install the bracing from ledger to ledger or from standard to standard. Brace each pair of standards where the bracing is installed from the inside ledger to the guard-rail of the lift below to allow access along a boarded lift.

When clear access is required on base lifts of tube and fitting scaffolds, the cross bracing may be omitted on the base lift provided the first lift does not exceed 2.7 metres, or the lift is knee braced. In either case the loading capacity of the scaffold will be reduced.

3.3.4.3. Plan Bracing

Plan bracing should be installed on those horizontal planes of the scaffold which are not stabilised against lateral distortion. The bracing should be connected from standard to standard, forming a complete series of triangles. Examples where plan bracing is required include:

- Missing Ties: Where an individual tie can not be installed at the manufacturer's recommended spacing plan bracing may be used to help span the extended distance between the adjacent ties. Note that the loading on the ties will be increased.

- Lateral Loading: Where loading bays are connected to the scaffold, the bays should be externally plan braced off the scaffold.

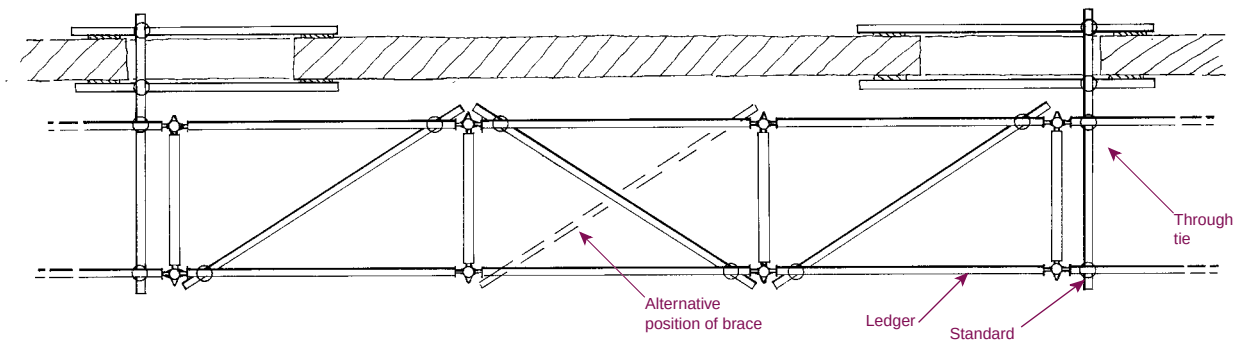

Figure 12. Example of plan bracing

3.4. Working Platforms

Working platforms should be wide enough and be sufficiently boarded out to allow safe passage of persons along the platform. They should also be capable of resisting the loads imposed upon them.

Where a person is liable to fall more than 2 metres, the working platform should be of the widths given in *Table 2: Widths of Access Scaffold Platforms*. A clear passageway of at least 430 mm wide should be maintained for persons between stored materials and the side of the platform.

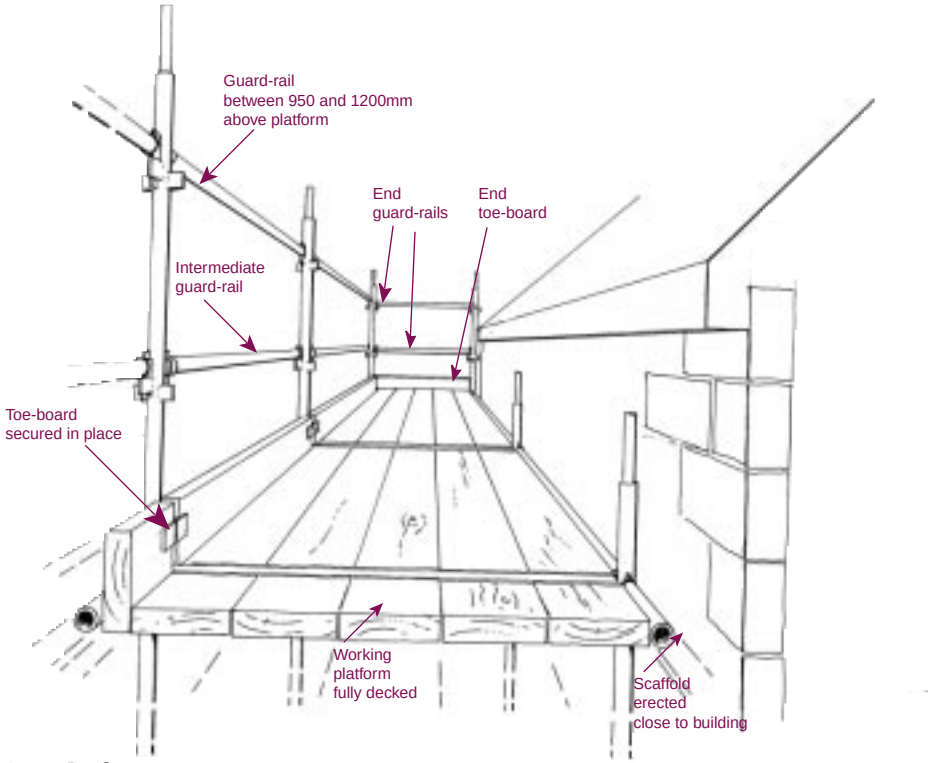

Figure 13. Working platform

Table 2: Widths of Access Scaffold Platforms

Purpose	Minimum Widths	Min. No. of 225mm Nominal Width Boards
	mm	
For access, inspection, gangways and runs	430	2 boards
Working platforms for men without materials or only for the passage of materials	600	3 boards
For men and materials provided there is 430 mm left clear for the passage of men or 600 mm if barrows are used	800	4 boards
For carrying trestles or other similar higher platforms*	1050	5 boards
For use in dressing or Roughly shaping stone**	1300	6 boards
For use to support a higher Platform where the Supporting scaffold is also Used for dressing and Roughly shaping stone**	1500	7 boards

**Provided that persons are protected from falling.*
***These scaffolds should be specially designed*
Source: BS 5973

3.4.1. Decking

Decking may consist of timber boards or proprietary decking units. Where timber boards are used they should comply with IS 745 or BS 2842, they should not exceed the spans given in Table 6 Appendix A. These spans may need to be reduced to accommodate heavy loading.

The transoms of many system scaffolds are constructed to provide a secure support for standard length boards.

Where the transoms do not positively restrain the boards from moving or tipping, the boards should be installed so that they overhang the transoms by at least 50 mm but by no more than 4 times their thickness. Boards that are nominally 38mm thick and less than 2.13 metres long should not be used unless they are positively restrained to prevent moving or tipping.

Platforms should be maintained in a fully boarded or decked condition. Where a platform has not been

fully boarded or has lost boards, either all boards should be removed or it should be fully boarded as soon as possible. Immediate steps should be taken to prevent access to partially boarded platforms by removing ladders, placing barriers across access points (including windows) and placing *scaffold incomplete* warning signs at all potential entry points.

3.4.2. Toe-Boards

Toe boards help prevent materials from falling and they also help prevent persons falling between the guard rail and platform. Toe-boards and end toe-boards should be fixed to all working platforms where a person is liable to fall more than 2 metres. The toe-boards should have a height of at least 150 mm above the platform and they should be securely fixed to the standards.

3.4.3. Maximum Gap Between Building and Platform

The scaffold should be erected as close as practicable to the finished structure. The maximum gap between the scaffold and the structure should be 300 mm where workers are required to sit on the edge of the platform nearest the structure and where ropes or chains provide a safe and secure handhold. Where practicable, the gap should be closed by using cantilever platform brackets at platform level.

3.4.4. Cantilever Platform (Stage) Brackets

Cantilever platform (stage) brackets may be used to fill the gap between the scaffold and structure and are available up to three boards wide. Some system cantilever brackets require a stabilising tie to be installed. It is essential to fit this tie, as without the tie the bracket can swivel on the standard and the boards can become dislodged.

Account should be taken of the extra load imposed by cantilever brackets on the inside line of standards. Fitting cantilever platform brackets will generally reduce the working platform service load and reduce the allowable number of boarded lifts and working lifts.

3.5. Guard-Rails

Guard-rails should be provided on all platforms, including trestles, where a person may fall in excess of 2 metres. The Safety Health and Welfare at Work (Construction) Regulations, 1995, at the time of writing, requires a single guard-rail. The height of the guard- rail should be between 950 mm and 1200 mm above the working platform and the maximum gap between toe board and the guard rail above it should be 800 mm.

An intermediate guard-rail should be installed where the risk assessment shows a risk of persons falling between the guard rail and toe board. Typical situations requiring an intermediate guard rail include: work on sloping roofs, work where the person may fall from an upper level, work where the person should bend or kneel adjacent to the guard rail, work where the gap between the toe board and guard rail exceeds 800 mm.

As the range of work where a person may fall between the guard-rail and toe- board is so great, it is recommended that an intermediate guard-rail be fitted. Where an intermediate guard-rail is fitted, the maximum distance between the rails and between the lower rail and the toe board should not exceed 470 mm. The height of the upper guard-rail should be between 950 mm and 1200 mm above the platform.

Guard-rails should be capable of resisting reasonably foreseeable horizontal and vertical loadings. In any case, guard-rails should be capable of resisting a horizontal load of not less than 1.25 kN (127 kg) without breaking, disconnecting or deflecting more than 200 mm and they should be capable of resisting a point load of 0.3 kN (30.5 kg) without an elastic deflection of more than 35 mm.

3.6. Falling Object Protection

Measures should be taken to prevent materials from falling from working platforms. A risk assessment will identify the most appropriate precautions for different areas of the site. Areas above pedestrian traffic, particularly those areas above entrances into the structure or above where persons are working, will present the highest risk and will require the greatest precautions.

3.6.1. Brick Guards

Brick guards may be hung from the guard rails and secured to prevent outward movement.

3.6.2. Sheeting

Sheeting may consist of netting, corrugated sheets or timber sheets. It should be fixed securely to prevent materials from passing through the sheeting. Sheeting should be inspected regularly, particularly after strong winds. Sheeting will significantly increase the wind loading on a scaffold and on the ties and tie couplers.

3.6.3. Fans

Fans normally consist of an inclined support extending from the building and covered in decking. Fans are often the most suitable method of protecting pedestrian traffic areas and access points into the structure.

The loads imposed on a scaffold by a fan, i.e. dead load, impact load and wind load, are usually substantial. The top of the fan should be tied to the scaffold where it is tied to the permanent structure and the bottom tube of the fan should be propped against the structure.

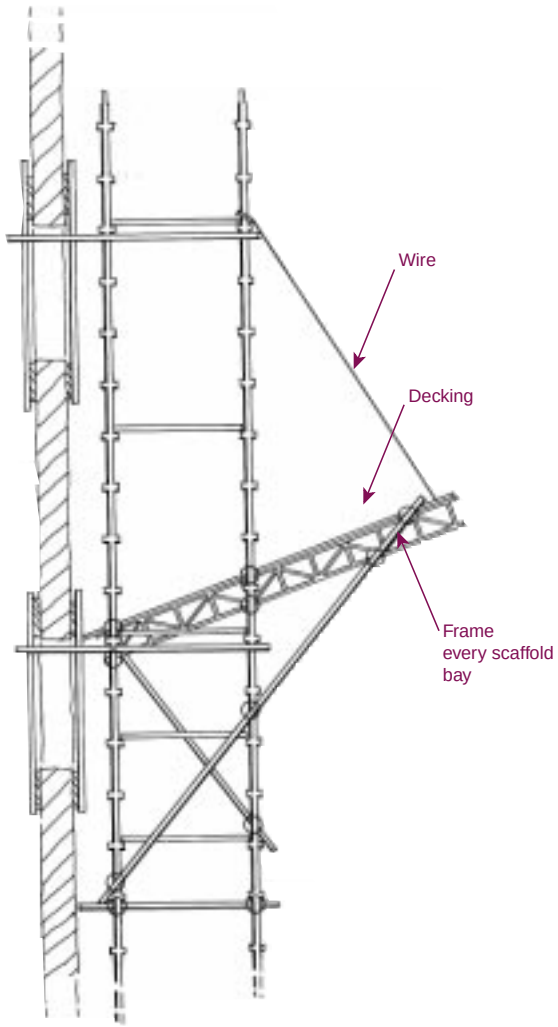

Figure 14. Example of a medium duty fan

3.7. Access to the Scaffold

A safe means of access to the scaffold should be provided. This may include, gang-ways, stairways, landings, ladders, ramps or hoists. Sufficient access points should be provided so that workers may easily gain access to their place of work.

An inadequate number of access points may lead to unsafe practices such as workers climbing scaffold tubes to gain access to or egress from their place of work.

3.7.1. Ladder Access

Scaffold access ladders should meet the minimum standards listed below:

- Ladder access towers, fixed to the outside of the scaffold, should be erected where practicable – otherwise the ladder arrangements should meet with the following requirements:
- The top of ladder stiles should be securely fixed to the scaffold by lashings
- The ladder should be set, where practicable, at an angle of not more than 4 vertical to 1 horizontal
- Each stile should be equally supported on a firm and level footing
- The ladder should extend at least 1.00 metres above the landing point or some other adequate handhold should be provided
- The maximum vertical distance between landings should be 9.00 metres
- Ladder wells should not exceed 500 mm in width, should be as short as practicable in length and be provided with guard-rails where practicable
- Landings should be provided with guard-rails and toe-boards

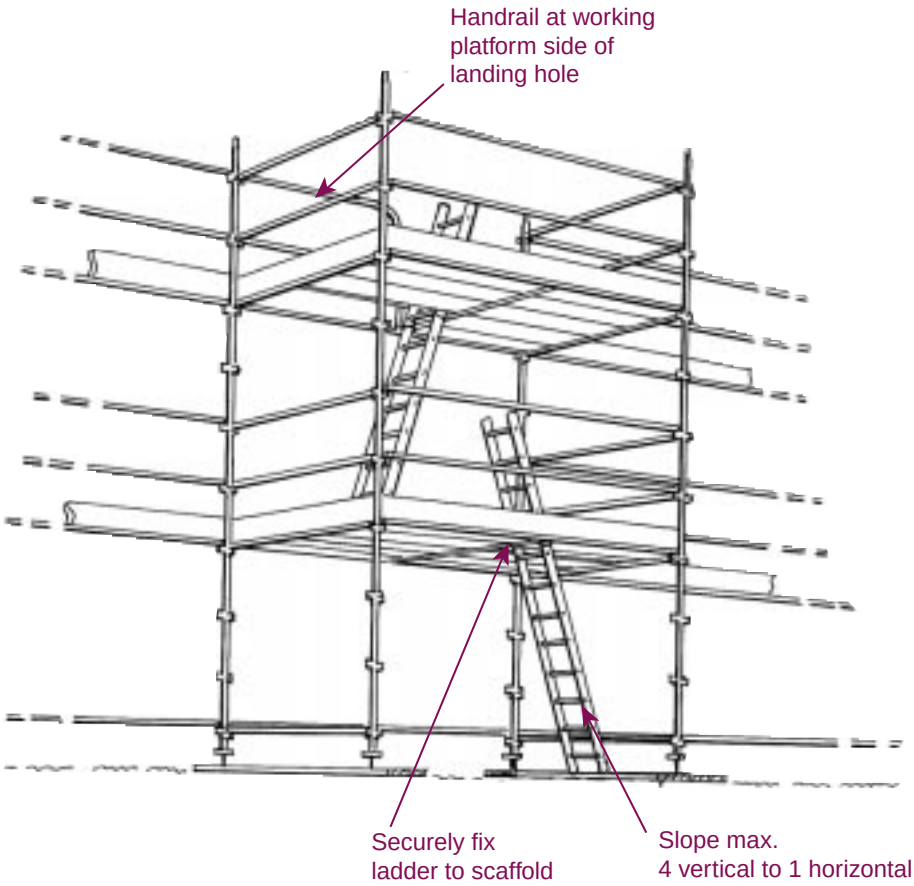

Figure 15. Example of ladder access tower

The provision of staircase towers or ramps should be considered when justified by the frequency of passage, height to be negotiated, duration of use or evacuation requirements.

3.8. Loading of the Scaffold

3.8.1. Loading Bays

The weights of pallets of building materials such as blocks and bricks are usually in excess of the recommended load ratings of the system scaffold manufacturers. A loading bay will therefore be required where it is necessary to lift pallets of heavy materials onto a scaffold. The provision of properly constructed loading bays can avoid the excessive loading of access scaffolds and the obstruction of gangways that can otherwise occur.

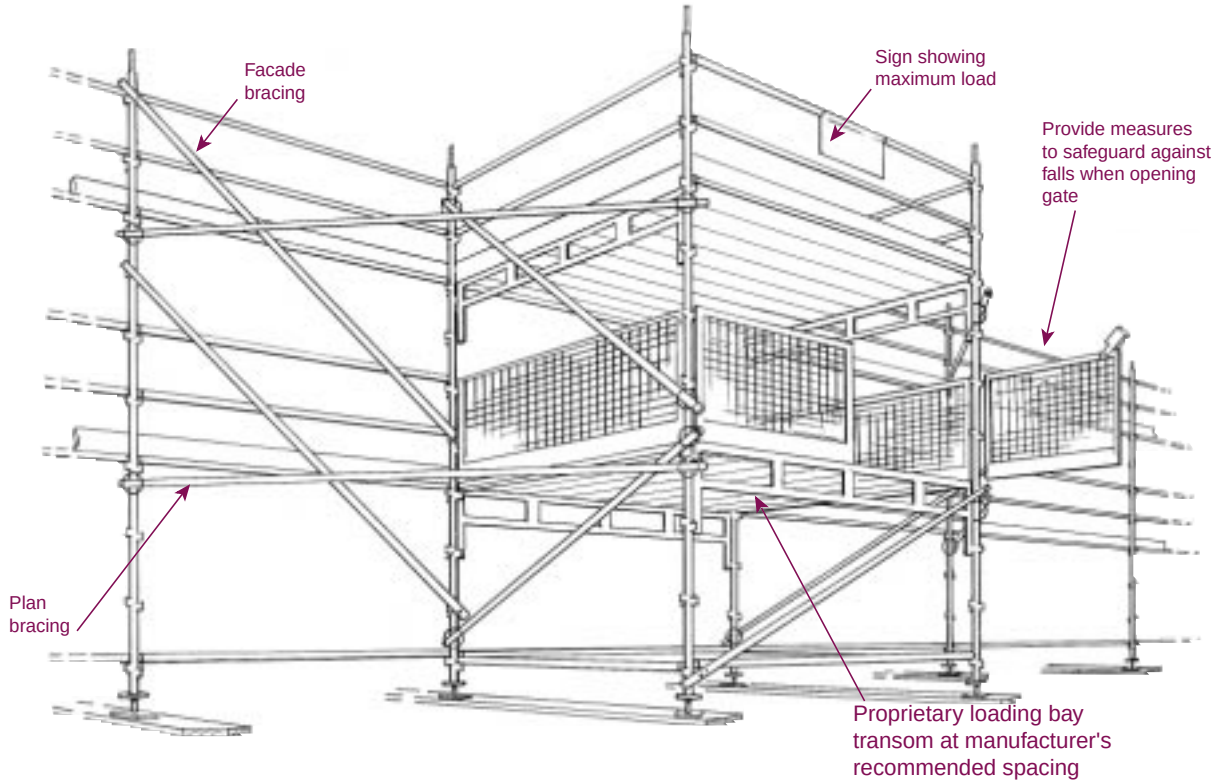

Figure 16. Example of a loading bay

Refer to the system manufacturer's instructions for the erection of loading bays.

Loading bays should be diagonally braced on all four sides or braced in compliance with the system manufacturer's recommendations. Where the internal facade bracing hinders access onto the scaffold from the loading bay the brace may be placed on the main scaffold adjacent to the loading bay or in accordance with the system manufacturer's recommendations. Issues which require consideration include:

- Standard transoms and at standard spacings and timber deckings at standard spans are not usually adequate to carry the higher loadings in a loading bay. System scaffold loading bays incorporate special load bearing transoms, often at reduced spacing.
- Where load bearing transoms are directly connected to the outside face of a scaffold, the capacity of the standards to support the combined loads imposed by the working platforms and the load bearing transoms should be assessed.
- Plan bracing should be installed from the outside corner of a loading bay to the main access scaffold and the main scaffold should be tied to the building with supplementary ties opposite these braces at intervals not exceeding 3 metres
- Where guard rails must be removed temporarily to facilitate loading, effective compensatory measures to prevent falls should be provided. These measures may include movable guard-rails or panels, hand holds, safety belts or harnesses affording an equivalent standard of protection as guard-rails

Temporarily unguarded openings or edges should not be left unattended and guard-rails should be replaced as soon as practicable.

3.8.2. Signs

Easily comprehensible signs showing the safe working load, for each working lift, should be placed on scaffolds and loading bays.

Max. Safe Working Load
per 2.5 Bay

790 kg

**(30 concrete blocks
+ 2 Workers)**

evenly distributed

Figure 17: Example of Sign for Working Platform with S.W.L. of 2.5 kN/m2

3.8.3. Loading Charts

Supervisors and equipment operators, e.g. crane and telescopic fork truck drivers, should be provided with easily comprehensible loading charts showing the weights of the typical materials used on the site. e.g. the weights of the pallets of bricks and blocks, scaffold boards and standards, mortar skips etc. This will enable them to estimate the load they are placing on the scaffold and ensure that it is less than the safe working load indicated on the signs.

3.9. Free-Standing and Mobile Access Towers

Free-standing and mobile access towers can provide a safe means of working at a height provided that they are properly constructed and used. Access towers have, however, been associated with serious accidents due to overturning or contact with overhead electricity lines.

3.9.1. Types of Tower

The two main types of tower in use are prefabricated aluminium alloy towers and steel towers. Components may include prefabricated frames, platforms, bracing, castor wheels, and outriggers. Steel towers are constructed from system scaffold components or from tube and fitting components.

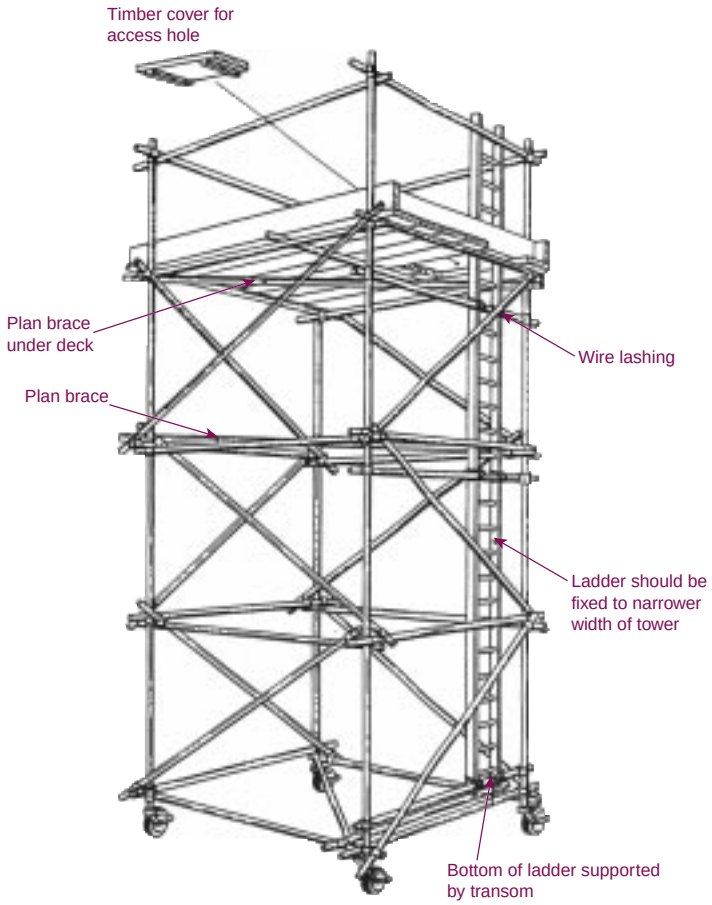

Figure 18. Tube and Fitting Mobile tower with internal ladder from BS 5973:1993.

HD 1004 (BS 1139 Part 3: 1994) gives guidance on standard mobile prefabricated towers not exceeding 8 metres platform height when used externally or 12 metres when used internally.

3.9.2. Manufacturer's Instructions

The manufacturers and suppliers of prefabricated and system tower scaffolds should provide instructions for the erection and use of the scaffold. These instructions should be available to persons erecting and using these scaffolds and they should be followed.

3.9.3. Stability

The conditions of use of the tower and environmental forces such as wind can adversely affect tower stability. Where the conditions of use or the wind forces are likely to be different from those covered by the manufacturer's instructions or this code, or the tower is erected in a location exposed to high winds, the overturning forces should be calculated by a competent person. Appropriate measures should be taken to ensure that the tower has a factor of safety against overturning of at least 1.5 in any direction. (See Section 2.3.2). For example:

- The stability of free-standing towers which are likely to be exposed to high winds, other significant horizontal loads or where loads will be hoisted outside of the middle third of the base width should be evaluated. Where there is a danger of overturning, an adequate safety factor against overturning in any direction should be obtained by the provision of stabilisers, outriggers, kentledge, guys or ties to adjoining structures as per the designer's advice.

3.9.4. Ground Surface

The ground surface should be suitable for the type of tower to be used. Where castors are to be used the surface should be even and holes, ducts, pits or gratings should be securely fenced or covered. Where the surface is sloping, the tower should be prevented from slipping. Base plates and sole boards should be used where the ground is soft.

3.9.5. Bracing

Prefabricated towers should be braced in accordance with the manufacturer's instructions. Where the tower is constructed of tube and fitting components, it should be adequately braced on all four sides and be braced in plan at every alternate lift.

3.9.6. Castors

Castors should be fitted with adequate brakes and they should be securely fixed to each leg of the tower to prevent accidental uncoupling.

3.9.7. Working Platform

The deck units or boards should be securely fixed to the frame. Toe-boards and guard-rails should be provided. The platform should not be over-loaded.

3.9.8. Tower Access

Access should be provided to the tower by using vertical or integral ladders, inclined internal ladders or stairways erected in accordance with the manufacturers' directions. Ladders should be attached to the shorter side of rectangular towers and within the base area of the tower. External ladders should not be used with aluminium towers. Access to the platforms should be through a hatch which is capable of being closed and secured.

3.9.9. Overhead Electricity Lines

Mobile access towers should not be used adjacent to overhead power lines. Where mobile access towers are being used in the same general area as overhead electricity lines, physical barriers and warning notices should be provided to prevent them coming close to the lines.

3.9.10. Instruction, Training and Supervision

Prefabricated towers such as aluminium alloy towers may only be erected by workers with adequate skills and training. Workers should be provided with adequate and comprehensible instructions both for the erection and checking of the tower. Competent supervision should be provided to ensure that towers are safely erected, checked and used.

The training for operatives erecting pre-fabricated towers should be appropriate to the work to be performed. Such training should include:

- Inspection and identification of components
- Systems should not be mixed
- Safe erection, dismantling and use
- Ground conditions
- Proximity hazards
- Bracing and ties
- Least height to base ratios
- Use of stabilisers
- Moving the tower
- Guard-rails and toe-boards
- Safe working loads

- Ladder access
- Use of castors.

3.9.11. Tower Use

Vertical or horizontal forces capable of over-turning should not be applied. Such forces may arise from pulling or pushing the tower along at a high level, lifting loads up the outside of the tower or from hauling heavy ropes or cables. Using hand tools such as drills can cause an additional horizontal force on the tower.

The tower should not be moved with workers or materials anywhere on the tower. It should be moved manually, pushing the tower at or near the base. Technical means should not be used to push towers.

The tower or its platforms should not be overloaded.

The castors should always be locked, except when moving the tower. Chocks should be used, where there is any doubt about the adequacy of the brakes.

Standard width scaffold couplers should not be used on aluminium alloy towers.

The access tower should be inspected and statutory form CR8 *Report of Results of Inspection of Scaffold* should be completed before using it. Warning notices should be placed on incomplete towers.

3.9.11.1. Prefabricated Aluminium Towers

Aluminium towers are light. This lightness is a positive advantage in relation to ease of erection and use and may help to avoid manual handling injuries. A light aluminium tower will, however, be less stable than a heavier steel tower of the same dimensions.

Prefabricated towers designed and constructed in compliance with HD 1004 (BS 1139, Part 3, 1994) should be stable in winds below 45 km/h (12.5 m/s). Where winds approaching this speed are expected, precautions should be taken such as tying the tower to adjoining structures or dismantling the tower to prevent the tower being blown over. Work on prefabricated towers should cease when wind speeds exceed 27.5 km/h (7.7 m/s) unless the manufacturer's or supplier's instructions explicitly permit such work.

The manufacturer's instructions should be followed and the maximum height to base ratios should not be exceeded. The necessary stabilisers and outriggers should be correctly installed.

3.9.11.2. Steel Towers

The maximum height to least base ratios for steel towers listed below should not be exceeded:

Table 3: Max. Height to least base ratio for steel towers

Tower Type	Max. Height to Least Base Ratio
Stationary towers within buildings	4.0
Mobile towers within buildings	3.5
Stationary towers adjacent to buildings	3.5
Mobile towers adjacent to buildings	3.0

From BS 5973: 1993

In calculating the height to base ratio, measure the height from ground level to the working deck or top lift and measure the base width as the least base dimension, centre to centre, of the shortest side of a rectangular tower.

Towers in locations exposed to high winds, subjected to other horizontal loads or left in place for a long time may not be stable even though they comply with the above ratios and further precautions may be necessary to ensure the stability of the tower.

3.10 Electrical Dangers

3.10.1. Overhead Electricity Lines

Where a scaffold will be erected adjacent to overhead lines then precautions should be taken to prevent persons or components coming into contact with such lines or from coming close to them.

Such precautions should be based on a risk assessment, detailed in the safety statement and/or the health and safety plan and will normally include one or more of the following, in order of preference: rerouting the lines, having the power turned off, installing barriers or insulation between the scaffold and the lines.

In addition, scaffolds erected adjacent to overhead lines should be earthed.

3.10.2. Portable Electrical Equipment

Portable tools used in construction should operate at no more than 125 Volts A.C. and be centre tapped to earth.

3.10.3. Lightning

Scaffolds on the roofs of high buildings or associated with some topographical features are susceptible to being struck by lightning. Such scaffolds should be earthed.

3.11. Erection on Public Streets

The erection and use of scaffolding adjacent to public streets creates hazards similar to those encountered by workers. The precautions will, however, need to be greater because of the large numbers who may be at risk, their unfamiliarity with the dangers and their curiosity about the work. High standards of physical protection and effective systems of work and supervision should be provided to protect the public.

The public should be excluded from the area around the work during erection, modification and dismantling. This may involve getting permission to close streets or footpaths while the scaffold is being erected or dismantled. Where the public can not be excluded, effective physical protection should be provided to prevent persons being struck by falling tools or materials.

Where footpaths are closed, adequate provision should be made to protect pedestrians from traffic. Access to the scaffold by the public should, so far as is practicable, be made difficult by the provision of hoardings and/or sheeting and by removing or preventing the use of access ladders at a lower level. Local Authorities may require a contractor to apply for a hoarding licence.

3.11.1. Through Access

Where the public are permitted to walk through the base of the scaffold, the precautions should include the points listed below:

- There should be sufficient headroom
- There should be no projections which may injure the public or their clothing
- A sound walking surface should be provided and maintained
- Adequate lighting should be provided

3.11.2. Adjacent Parking or Traffic

The scaffold should be protected from traffic by the use of appropriate warning signs, lights, barriers or traffic cones. Where vehicles are permitted to park adjacent to the scaffold, the risk of damage to the scaffold is high, particularly so if the vehicles park nose-in or tail-in to the scaffold. Vehicle damage should be prevented by preventing such parking or by providing barriers. Where this is not practicable, the scaffold should be inspected frequently so that damage may be detected and remedied quickly.

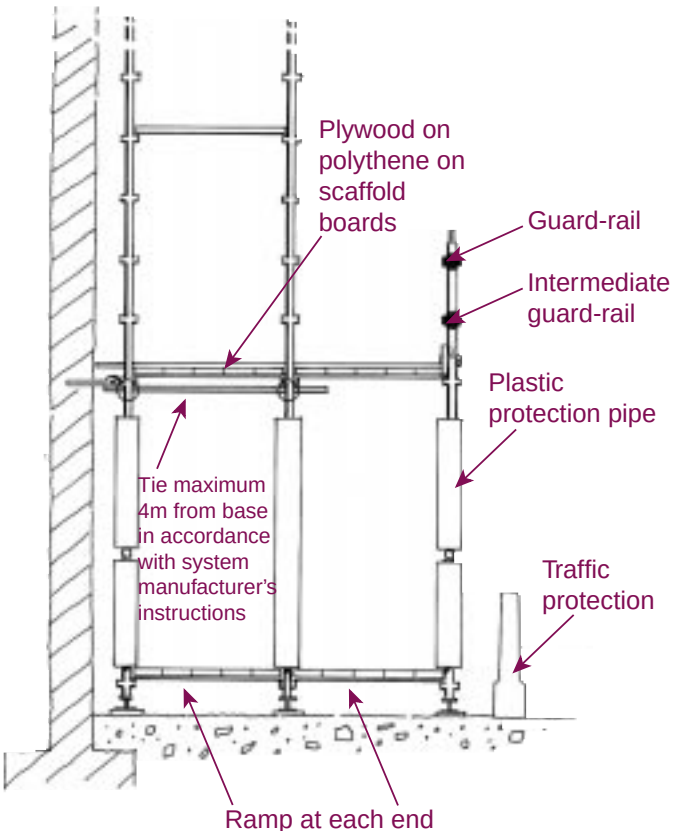

Figure 19. Example of through-access

4. Inspection and Hand-Over

An adequate hand-over procedure for transferring control of the scaffold from the erector to the user is an important part of managing scaffold safety. Both the scaffold erector and the user should be satisfied that the scaffold can provide a safe working platform and can carry the imposed loads safely. An adequate hand-over procedure will include the points listed below:

- The areas of the scaffold which have been handed over should be clearly identified
- The maximum capacity of the loading bays and working platforms and the tie spacing should be clearly stated
- The entire area of the scaffold should be inspected before it is taken into use. The scaffold inspection checklist given in Appendix B on page 41 or another suitable checklist may be used
- *"Scaffold incomplete"* warning notices should be removed from the finished scaffold
- A report of the inspection should be made on Form CR8 Report of Results of Inspection of: Scaffold and a copy of the report should be retained on site
- The person responsible for further modifications and inspections of the scaffold should be identified.

5. Use, Modification and Maintenance

5.1. Scaffold Users

A scaffold should not to be used unless it is properly constructed and is suitable for the purpose for which it is required, has been inspected and form *CR8 Report of Inspection* has been completed.

Each contractor (including sub-contractors and the self-employed) should satisfy himself (personally or through a servant or agent) that the scaffold is stable, that the materials used in its construction are sound and that it is safe to use. Each contractor should satisfy himself that the scaffold has been inspected by a competent person and that form CR8 Report of Inspection has been completed before use.

Users (including contractors and workers) should:

- Be provided with relevant information on the conditions of use of the scaffold, including the loading capacity of the scaffold, in a comprehensible form
- Not overload the scaffold either locally or in general
- Not interfere with or misuse the scaffold
- Promptly report defects in the scaffold to whoever is in control of the scaffold
- Not leave a scaffold in a hazardous condition for current or subsequent users

5.2. Modification

Uncontrolled modification of a scaffold, particularly if carried out by persons without adequate competence, can lead to instability and an increased risk of persons falling from the scaffold. Modifications to ties, bracing, ledgers, transoms and decking should be identified, requested and made in good time. (See 2.5)

Only competent persons who have been trained and are experienced in the kind of work may make modifications to scaffolds.

A sufficient number of competent scaffolders should be available to ensure that modifications are made in good time

Guard-rails and toe boards in a single bay may be temporarily removed by persons who have been appropriately instructed in the safe means of removing and replacing the guard-rail. They should be instructed in the legal requirement to remain in attendance at the location of the removed guard-rail or toe-board until it has been replaced.

5.3. Maintenance

The scaffold should be maintained in a safe condition for the entire period of its use. See 2.5 Planning for Use and Maintenance

5.4. Inspection Before and During Use

Scaffolds should be inspected before use and at least every seven days and after any circumstance that might affect the stability or safety of the scaffold. Such circumstances include:

- Modification
- Period without use
- Exposure to bad weather
- Damage, including impact of traffic or site equipment with the scaffold

The scaffold inspection checklist given in Appendix B or another suitable checklist may be used. A report of the inspection should be made on *Form CR8 Report of Results of Inspection of: Scaffold* and a copy of the report should be retained on site.

6. Dismantling

Dismantling a scaffold can place large loads on the scaffold unless the work is planned to keep the amount of material stored on the scaffold to a minimum. The work should be planned so that the scaffold will not become unstable, workers are prevented from falling from the scaffold and others are protected from the risk of falling materials.

6.1. Stability

The scaffold should be examined to ensure that the foundation is adequate and that all ties and braces are in position and are effective

Any defects found in the scaffold should be made good before commencing dismantling

The dismantling should be planned so that stability is assured by providing adequate bracing and ties and by restricting the imposed loads due to stacked scaffold components.

Where the scaffold must be used to temporarily store large amounts of components, it should be strengthened and stabilised, e.g by providing extra standards, ties or rakers

Prominent warning notices should be placed and access to the danger zone should be prevented

6.2 Protection from Falls

Workers should be protected from falling during dismantling of scaffolding. (See Section 3.1)

6.3. Protection from Falling Objects

Workers and members of the public should be protected from the risk of being struck by falling scaffold components. (See Section 3.6.)

7. Competence

The risks associated with the erection, use and dismantling of scaffolding are potentially very high. Persons given the task of erecting, altering, using or dismantling scaffolding should have the necessary competence to perform their tasks safely.

7.1. Competence of Scaffolders

A scaffold should not be erected, substantially added to, altered or dismantled unless it is performed:

- Under the immediate supervision of a competent person, and
- By persons trained and experienced in the kind of work

A competent person is a person who has been fully trained, has acquired the necessary knowledge and practical experience and has received the necessary instructions for the erection, alteration or dismantling of the type of scaffold.

7.1.1. Training

Formal training is required for those who erect, substantially add to, alter or dismantle a scaffold. The training should include training on any risks involved. The extent of training required will depend on the type of work normally undertaken and on the type of scaffold. The minimum acceptable standard of training is the approved FÁS Construction Skills Certification Scheme for scaffolders, or an equivalent training programme accredited by FÁS.

7.1.2. Experience

A competent and experienced person should supervise the erection, alteration or dismantling of a scaffold. The person should be experienced in the kind of work being undertaken.

7.1.3. Assessment, Certification and Registration

In order to help employers, contractors and project supervisors determine whether scaffolders have the necessary competence to erect or dismantle scaffolding, FÁS have introduced a programme to assess scaffolders' competence, to issue certificates to those with the necessary skills and to keep a register of qualified scaffolders.

Employers, contractors and project supervisors for the construction stage should satisfy themselves that persons erecting scaffolding have the necessary training by seeking evidence of FÁS certification or an equivalent certification accredited by FÁS.

7.2. Competence for Inspection

The designated person inspecting a scaffold should be competent. A competent person is a person who is fully trained, has acquired the necessary knowledge and practical experience and has received the necessary instructions for the inspection of the type of scaffold.

7.2.1. Training for Inspection

While it is relatively easy to inspect for certain defects such as missing guard-rails, an untrained person may not be able to form an opinion on the stability of the scaffold.

Those performing simple scaffold inspections should have received at least one day of formal training in scaffold inspection and be competent. Extra training would be required for the inspection of complex scaffolds.

Employers, contractors and project supervisors should seek evidence of appropriate certification of training in order to verify that training has been received. Periodic refresher training should be provided where appropriate.

7.3. Training and Instruction for Scaffold Users

All scaffold users should receive training and instruction in the use of the scaffold. It is important to provide this training and instruction because the users may not otherwise realise when they are at risk, may not request modifications in time and may interfere with the scaffold, putting themselves and others at risk.

This training may be provided as part of the induction which all persons who are likely to use the scaffold, either as access or as a working platform, should receive.

7.3.1. Contents of Induction

The induction of scaffold users should cover at least the areas listed below:

- Users should be able to recognise when a scaffold is complete, e.g. full boarding, guard-rails and toe-boards present.
- The meaning of warning signs or scaffold tagging systems in use.
- That users should not interfere or make modifications to scaffolding. Modifications may only be made by a competent person with the appropriate training and certification.
- The maximum loading capacity of the scaffold working platforms and loading towers, illustrated with specific comprehensible examples relating to the materials in use on the site.
- That users should report defects to a designated person.
- That materials should not be thrown from scaffold.
- That users should use the designated access points and should not climb the scaffold.

7.4. Training and Instruction of Equipment Operators

The mechanical placing of materials on a scaffold can give rise to significant impact loads and overloading of the scaffold can provoke a general collapse of the scaffold.

Equipment operators such as crane drivers and telescopic fork-truck drivers as well as signallers (banksmen) should be competent, have received training and assessment and received certification. FÁS provides training courses for equipment operators and assesses, certifies and registers trained operators. Other appropriately qualified bodies may apply to FÁS for accreditation of courses.

Lifting equipment operators should be informed of the safe working load of the scaffold working platforms and loading bays. Comprehensible examples relating to the materials in use on the site should be provided. It may be necessary to review the information provided as the materials or scaffold lay-out changes.

Excavation close to the scaffold can undermine it. Excavator operators should be informed of the minimum distances that they should observe when excavating in the vicinity of the scaffold

Appendix A

Tube and Fitting Scaffolds

Tube and Fitting Scaffolds

Tube and fitting scaffolds form only a small proportion of scaffolds erected in Ireland. Refer to BS 5973, *Code of Practice for access and working scaffolds and special scaffold structures in steel* for comprehensive information on the design and erection of tube and fitting scaffolds.

The following tables listed below are derived from BS 5973: 1993.

Table 4: Maximum Bay Centres for Tube and Fitting Scaffolding

Type of Scaffold	**Light Duty** *Class 2* Painting, Stone Cleaning, Pointing,	**General Purpose** *Class 3* General building work including Brickwork, Window Fixing, Plastering	**Heavy Duty** Brickwork, Blockwork, Heavy Cladding	**Special Duty** *Class 4* Masonry, Concrete Blockwork, Very Heavy Cladding
Distributed load on Working Platform	1.5kN/m^2 (153kg/m^2)	2.0 kN/m^2 (204kg/m^2)	2.5 kN/m^2 (255kg/m^2)	3.0 kN/m^2 (306kg/m^2)
Maximum Bay Length	2.4 m	2.1 m	2.0 m	1.8 m
Commonly used Widths using 225 mm boards	4 boards	5 boards or 4 boards + 1 inside	5 boards or 5 boards + 1 inside or 4 boards +1 inside	6 to 8 boards
Maximum Number of Platforms	2 working platforms	2 working platforms plus 1 at very light duty	2 working platforms plus 1 at very light duty	1 working platform plus 1 at very light duty

From Table 1: BS 5973: 1993

Table 5: Frequency of ties in square metres per tie* for tube and fitting scaffolds

For wind speeds of less than 39m/s** and scaffold height less than 50 m for unsheeted and 25m for sheeted scaffolds	Unsheeted Scaffolds	Sheeted Scaffolds
Ties 12.5 kN safe working capacity		
Movable Ties	32	25
Non-Movable Ties	40	32
Ties 6.26 kN safe working capacity		
Movable Ties	32	12.5
Non-Movable Ties	40	16
Up to 50% Reveal Ties 3.5 kN		
Movable Ties	25	—
Non-Movable Ties	31	—
Over 50% Reveal Ties 3.5KN	22	—

From BS 5973: 1993

* *Square metres per tie can, for practical purposes, be taken as:*
Square metres (m2) of façade divided by the number of evenly spaced ties
** *CP3: Chapter V: Part 2*

Table 6: Maximum span of scaffold boards

Nominal Board Thickness: Mm	Maximum Span Between Transoms: metres
38	1.5
50	2.6
63	3.25

From BS 5973:1993

Appendix B
Example Check-Lists

Inspection of Material Before Use Checklist

Site .....

Location .....

Date ..... Copies to: .....

Item	Quantity	Comments	Acceptable Y/N
Sole Boards		.....	.....
Base Jacks		.....	.....
Base plates		.....	.....
Standards		.....	.....
Ledgers		.....	.....
Transoms		.....	.....
Intermediate Transoms		.....	.....
Right Angle Couplers		.....	.....
Scaffold Tube		.....	.....
Decking		.....	.....
Diagonal Braces		.....	.....
Access stairs or ladders		.....	.....
Cantilever Bracket Assemblies		.....	.....
Bridging Ledgers		.....	.....
Erection and Use Instructions		.....	.....
Other Components		.....	.....

Scaffold Hand-Over Form

Site .....

Location .....

Date ..... Copies to: .....

Area Of Scaffold Handed Over (Identify using grid-lines)	....
Maximum Loading Capacity Of Working Platforms (in kg/bay or for non-standard bays in kg/m^2)	....
Maximum Number Of Platforms To Be Loaded	....
Scaffold Inspection Performed	Yes ☐ No ☐
CR8 Report Of Inspection Signed	Yes ☐ No ☐
Person Responsible For Making Periodic Inspections	....
Person Responsible For Authorising Modifications, e.g. Site Agent, Foreman, Scaffolder	....
Necessary Design Information To Enable Inspections To Be Performed E.G. Tie Spacing, Plan or Ledger Bracing Etc.	....

Signed

Erector ..... User .....

Before using a scaffold the scaffold should be inspected and form CR8 should be completed

A scaffold may be inspected by a person who is competent, this may include a trained scaffolder or another person who has been trained in scaffold inspection

Scaffold Inspection Checklist

Site..... Location.....

Inspected By ..... Date ..... Copies to: .....

Item	Defect and Location - Use Grid Lines	Date Corrected
Foundations	.....	.....
Sole Boards	.....	.....
Base plates & Base Jacks	.....	.....
Standards	.....	.....
Ledgers	.....	.....
Transoms	.....	.....
Tie Spacing & Capacity	.....	.....
Facade Bracing	.....	.....
Plan Bracing	.....	.....
Cross Bracing	.....	.....
Guard-Rails	.....	.....
Toe-Boards	.....	.....
Decking	.....	.....
Loading	.....	.....
Access	.....	.....
User Behaviour & Housekeeping	.....	.....
Anticipated Hazards next 7 days	.....	.....
Other (Traffic, Electricity, Fans)	.....	.....
Observations	....	....

Appendix C

Form CR8 Report of Results of Inspection of: Scaffold

The Safety, Health and Welfare at Work (Construction) Regulations, 1995
S.I. No. 138 of 1995, Form CR8

Report of results of inspection of : **SCAFFOLDS**
[Approved by the National Authority for Occupational Safety and Health in accordance with Regulation 65(1)(d)]

Name or title of Employer or Contractor#:

Address of Registered Office,
Head Office, or Site:

Location and Description of Scaffold and other Plant or Equipment Inspected (1)	Date of Inspection (2)	Result of Inspection State whether in good order (3)	Signature of person who made the inspection (4)

i.e. the person for whom the Report has been prepared (See notes on next page)

NOTES: CR. 8

1. This form contains the report of the results of inspections of scaffolds including boatswains chairs, cages, skips or similar plant or equipment used to fulfil a similar purpose, and from any part of which a person is liable to fall a distance of more than 2 metres.

2. Any scaffold or any of the above-mentioned plant or equipment should be inspected as follows:
   [a] before being taken into use,
   [b] after any modification, period without use, exposure to bad weather or any other circumstances which may have affected its strength or stability or displaced any part of it, and
   [c] at least once every 7 days.

3. The report should be signed by the person making the inspection.

4. The report shall be kept on site while work is being carried out, otherwise it shall be kept at an office of the contractor for whom the inspection was carried out. Where it is likely that work will not exceed 30 working days in duration, the report may be kept off-site.

5. (a) No report need be made in the case of a trestle scaffold.
   (b) A scaffold need not be inspected by reason only of the fact that it has been altered, added to, or partly dismantled.

6. Regulation 127(5) provides as follows:-
   "Wherever under these Regulations records are required to be made and kept it shall be sufficient compliance with such requirement if the individual making the examination enters his or her report in the approved form in a computer and duly authenticates it as soon as practicable after completing the examination and it shall be sufficient compliance with such requirement if the report is kept by the user in a computer."

Appendix D
Weights of Typical Building Materials

Table 6: Mass of Scaffolding Materials

Scaffolding Materials	*Mass*
Steel scaffold tube, 48.3 mm diameter	4.37 kg/m
Steel couplers and fittings	1.00 kg to 2.25 kg
Boards 38 mm thick 50 mm thick 68 mm thick } 225mm wide	 6 kg/m or 25 kg/m^2 8 kg/m or 33 kg/m^2 10 kg/m or 41 kg/m^2

Table from Section 6, BS 5973: 1993

Table 7: Mass of Quantities of Scaffolding Materials

Mass *(tonne)*	**Length of Steel Tube** *(m)*	**Approximate number of steel fittings** *(average 1.8kg)*	**Number of boards** *(63mm x 225mm of length 2.45m)*
1	228	560	40
2	457	1120	80
3	685	1680	120
4	915	2240	160
5	1143	2800	200
7	1600	3920	280
10	2286	5600	400
15	3430	8400	600
20	4570	11200	800
25	5720	14000	1,000

Table from Section 6, BS 5973: 1993

Table 8: Mass of Persons and Materials (See manufacturers' specifications where mass may be different)

Item	**Mass**
Person (average)	80 kg
Person with small tools (average)	90 kg
Spot board and mortar	30 kg
Wheelbarrow full of mortar	150 kg
Tarpaulins and fixings	1 kg/m^2
Ladders and fixings	8 kg/m
500 bricks	1375 kg
500 concrete bricks (15N/mm^2)	1750 kg
50 concrete blocks (100x215x440)(5N/ mm^2)	1,020 kg
Timber (softwood)	500 kg/m^3 to 650 kg/m^3
180 litres of water or liquids in containers	200 kg
Packaged flooring tiles, ceramic tiles, roofing tiles, Slates	1600 kg/m^3

Table derived from Section 6, BS 5973: 1993

Table 9: Mass of an Unboarded Lift One Bay Long (incl. two standards, two ledgers, two transoms, and a portion of bracing, ties and fittings)

Lift Height	**Length of Bay (m)**						
	1.2	**1.5**	**1.8**	**2.0**	**2.1**	**2.4**	**2.7**
	Mass of Unboarded Lift						
m	*kg*	*kg*	*kg*	*kg*	*Kg*	*kg*	*kg*
1.5	63	66	69	70	71	74	77
2.0	68	70	73	75	76	78	81

Table from Section 6, BS 5973: 1993

Appendix E
Information Sources

Statutory Provisions

Safety Health and Welfare at Work Act, 1989
Safety Health and Welfare at Work (General Application) Regulations, 1993
Safety Health and Welfare at Work (Construction) Regulations, 1995

Irish Standards

IS/EN74: 1989	Couplers, loose spigots, and base plates for use in working scaffolds and falsework made of steel
IS 745: 1989	Machine graded home grown timber scaffold boards
IS/HD 1000:1989	Service and working scaffolds made of prefabricated elements
IS/HD 1039	Steel tubes for falsework and working scaffolds. Requirements. Tests

British Standards, Codes and Other Standards

BS 1139:	Metal scaffolding, Parts 1 to 5 (HD 1000 Harmonisation Document Service and Working Scaffolds made of prefabricated elements)
BS 5973:	Code of practice for access and working scaffolds in steel
BS 5974:	Codes of practice for temporarily installed suspended scaffolds and access equipment
ISO 4054	Scaffold couplers
EN 39 and EN 244:	Steel tubes
BS 6399:	Part 3, CP for imposed snow loads
CP 3:	Code of basic data for the design of buildings Chapter V Loading Part 2 Wind loads
BS 6399:	Loading for buildings Part I Code of practice for dead and imposed loads Part 3 Code of practice for imposed roof loads
BS 4074:	Metal props and struts
BS 1397:	Industrial safety belts and harnesses
BS 2830:	Cradles and safety chairs
BS 8093:	Code of practice for the use of safety nets, containment nets and sheets on constructional works
BS CP93:	Safety nets
BS 3913:	Specification of industrial safety nets
BS 2095 and BS 2826:	Light and heavy-duty safety helmets
BS 449:	Parts 1, 2 and 4 amendments: Structural steel
BS 5507:	Part 3, Falsework equipment
BS 5975:	Falsework
BS 302:	Wire ropes for cranes and general engineering purposes
BS 4978:	Timber grades for structural use
BS 1129:	Timber ladder steps, trestles and lightweight stagings
BS 648:	Schedule of weights of building materials
BS 2482:	Specification for timber scaffold boards
BS 5268:	Structural use of timber
BS 6180:	Code of practice for protective barriers in and about buildings
BS 4848:	Specification for hot rolled structural steel sections Part 2 Hollow sections

Health and Safety Authority Guidance

Guidelines to the Safety Health and Welfare at Work (Construction) Regulations, 1995
Guidelines on Preparing Your Safety Statement
Workplace Heath and Safety Management – Practical Guidelines
Build in Safety – A Short Guide to Good Practice and Legislation
Stay Safe on Site
Scaffolding Safety Video

Health and Safety Executive (UK) Guidance Notes

HSG 10:	Safety in Roofwork
GS 15:	General access scaffolds
GS 42:	Tower scaffolds
GS 28/3:	Safe erection, Part 3: Working places and access
GS 31:	Safe use of ladders, step-ladders and trestles
GS 25:	Prevention of falls by window cleaners

Textbooks

Wind Loading Handbook : Newberry and Eaton : BRE : HMSO
The Assessment of Wind Loads : BRE Digest 346, Parts 1 to 7 : HMSO
Wind Loads on Canopy Roofs : BRE Digest 284 : HMSO
Wind Environment around Tall Buildings : BRE Digest 141 : HMSO
Wind Forces on Unclad Tubular Structures : Constrado Publication 1/75
Access Scaffolding. S. Champion. Longman Group

Organisations

Health and Safety Authority, 10 Hogan Place, Dublin 2, (01) 614 7000
FÁS, Ballyfermot, Dublin 10
National Association of Scaffolding Contractors: Construction House, Canal Road, Dublin 6.

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